New Zealand

JOURNAL OF AGRICULTURE

HUNGRY MILLIONS STILL ENTREAT: "FOOD! FOOD!"

VOL. 70, No. 6. WELLINGTON, JUNE 15, 1945

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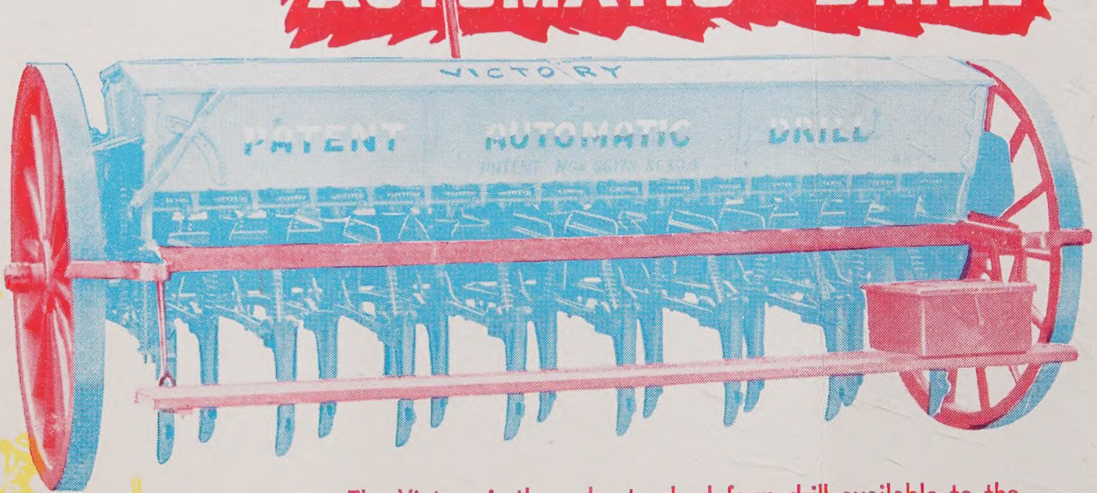

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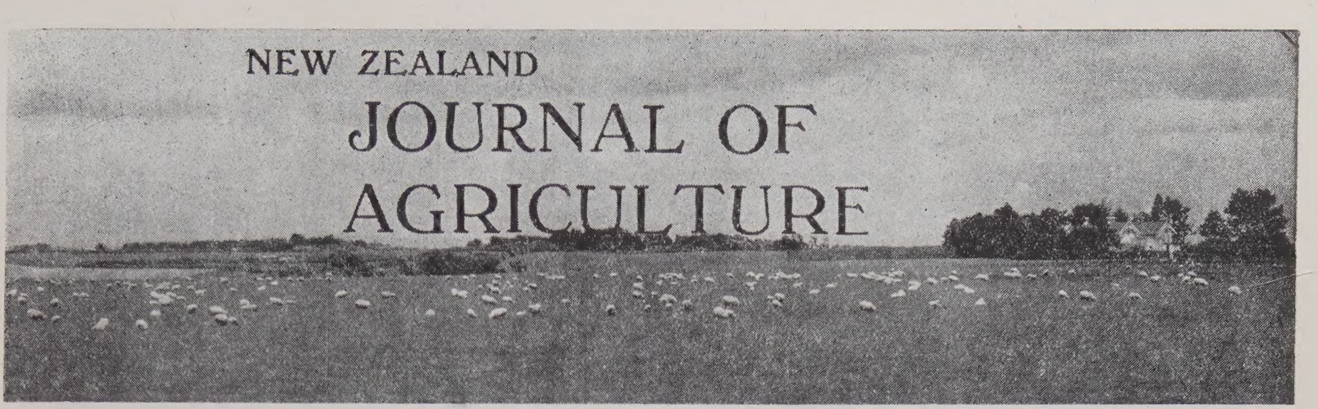
NEW ZEALAND
JOURNAL OF
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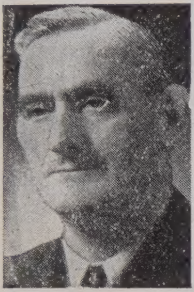
Vol. 70, No. 6. Published by Direction of Hon. B. Roberts, Minister of Agriculture. June 15, 1945.

£5 per Acre CROP SUBSIDY SCHEME, 1945-46



MESSAGE FROM THE HON. B. ROBERTS, MINISTER OF AGRICULTURE.

IN making this appeal for increased pig production, I do so knowing that pig-producers have made a wonderful effort in providing for the needs of all the Allied armed forces in the Pacific in substantially increasing the number of baconers produced last season by 59,000.

You are aware that the target set for the 1945-46 season is 50,000 tons of pig-meats—8,000 tons, or 150,000 pigs, more than last year. You can do this without increasing your breeding stock, although that is desirable. An increase in the number of pigs slaughtered per sow from 8.8 to 10.5 pigs, which you achieved in 1941, can be accomplished again, to make the production of 50,000 tons a fact.

To assist you in this effort the Government has decided to continue the crop subsidy scheme of £5 per acre for winter pig feed. I sincerely trust that you will take full advantage of the scheme, particularly as the imported grain position for next season is in some doubt.

Over 5,000 farmers are benefiting from the crop subsidy scheme; now is not too early to plan next season's cropping. Full details of the crop subsidy scheme are available from your local District Pig Council, the nearest office of the Department of Agriculture, or your dairy company.

IT is not too early to consider now what steps can be taken during the coming year to provide home-grown crops to cope with the feed problem when dairy by-products are inadequate to supply the requirements of the pigs on hand.

Actual results obtained by dairy-farmers, which should have a peculiar significance for every dairy-farmer who is desirous of improving his pig returns, are:—£4 net per milking cow from pigs; gains in store pigs from 50 to 140lb. between May 1 and August 1 at a cost of only 6/- per pig for bought-in foodstuffs; successfully wintering 40 stores without loss of a single pen.

One of the features common to all such results is the provision of a small area of crops for supplementary feed for pigs. It is not suggested that this factor outweighs the general management factor, but it is surely rather a direct reflection of the latter, and the man who has the foresight to provide for a cheap supply of food to carry pigs over the lean period, and incidentally to finish them when the prices are the highest, is also the man who provides housing and feeding at the right level throughout the season.

This provision of cheap supplementary food for pigs at those periods of the year when the dairy by-products slump markedly is an excellent means of securing greater profits from the pig section of the farm, thereby benefiting the whole farm economy.

Cropping Programme

The cropping programme adopted should fulfil the following requirements:—

(a) It should fit in with any cropping carried out for the dairy herd.

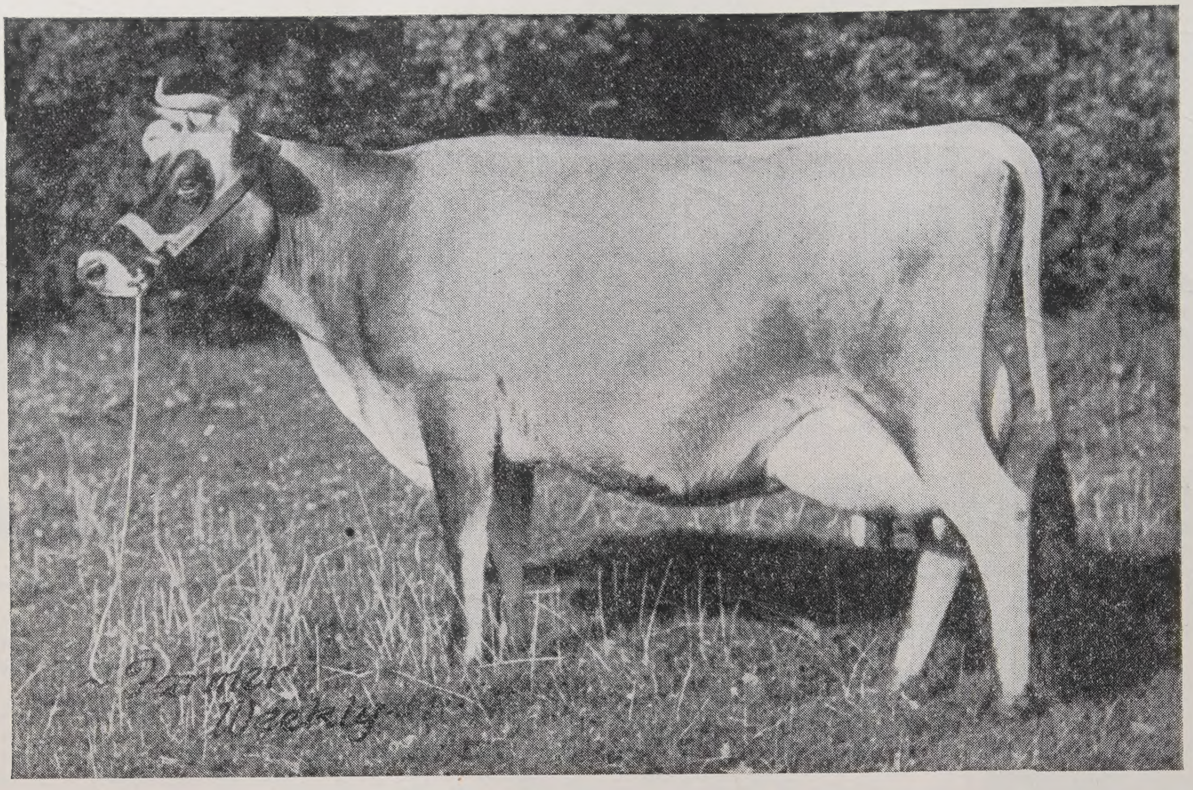
(b) It should make provision for wintering economically sufficient pigs to cope with the flush of dairy by-products effectively. (Where conditions for wintering are good it would be safe to produce surplus pigs for sale in spring).

(c) It should even up feed supply at any period when the milk supply drops suddenly, so that the pigs can be finished as intended rather than sold on a gorged and weakened market, such as happens every autumn.

Just how far a cropping programme can be carried out will depend on the labour available in individual cases, as well as on other obvious factors which govern the relative profitability of growing as against buying in supplementary foods, but it can be stated that for average farms, where soil and climatic conditions are suitable, it will be found more profitable to grow some crops for one or more of the above-mentioned purposes.

Choice of Crop

The choice of crop usually depends on individual conditions, including soil and climate, and labour available for preparation, sowing, harvesting, and feeding the crops.



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It should be determined also by the yield obtained for effort spent. It is no use growing a crop you like when another that yields twice as much could be grown with equal success. In cases where labour is inadequate the choice may rest at present on a crop the pig can harvest for itself. The following crops are dealt with as a selection of those most suitable for pigs and applicable to the varying conditions encountered throughout the country. A variety of crops will usually be found most satisfactory, and any farmer in the Dominion should be able to select at least two or three of these crops to grow each year under a rotational system for his pigs.

The table below is inserted to help determine which are the most profitable crops to grow. Familiarity with individual crops may have a bearing on the choice, but the average yields in tons per acre will give some indication as to whether it should be worth while trying a new crop.

Where they can be satisfactorily grown grains, particularly barley, maize, and peas, provide an admirable means of balancing and improving rations based on skim-milk or whey. Bulky feeds such as roots are of low feed value, unless some meat-meal and grain is fed along with them. A pound of meal per head per day makes roots really worth while.

It is impossible to deal with the cropping practices in detail, as these vary from place to place, according to soil and climatic conditions. The assumed yield per acre of the various crops is on an arbitrary basis, and does not necessarily represent an average crop. It would get us no further forward if we worked on the average crop for the whole of New Zealand; yields vary considerably, not only as between districts, but according to the time and care given.

Wherever yields are known it is a simple matter to compare two crops from the aspect of relative profitability, and good yields are essential to profitable crop production.

The crops marked X are eligible for subsidy under the crop subsidy scheme of £5 per acre.

Protein or meat-meal is costly, but very useful, especially in winter, and by growing some of the richer protein crops, such as peas or lucerne, the cost of protein supplements which require to be purchased when the skim-milk fails can be reduced. For the whey feeder protein is of great value at all seasons of the year.

On the basis of the yield that any farmer can expect from any particular crop he can work out the area required to provide the winter feed for the number of pigs he wishes to winter.

A half to 1lb. of protein-rich meal, such as meat-meal, pea-meal, etc., should be used where roots are to provide the main feed supply. Making allowance for this, 1 ton of carrots or other roots of similar value will be just about enough to feed two pigs of 70lb. live-weight for 90 days. A 20-ton crop should provide for 40 pigs. The area required for pigs can be calculated from this. Usually it will be necessary only to add this area to that already being cropped for the dairy herd.

Combination of Crops

In planning the winter food supply a variety of crops rather than just one crop will prove best. The period at which they are available varies to some extent, and this can be made use of in smoothing out food supplies over a longer period, which might extend from February to September.

A combination of maize and pumpkins, where these can be satisfactorily grown, is excellent. Barley and peas can be recommended for those districts suited to their proper harvesting, which are not usually the main dairying and pig-raising districts. In these districts the root crops which yield highly will be most successful, due regard being paid to the resistance to such pests, diseases, etc., which may be present. Meat-meal, linseed- or pea-meals, according to relative values, or else combinations of the first with either of the other two, should be used to supplement all root crops.

CROPS FOR PIG FEED.

Crop.		Sowing			Harvesting.	Yield per Acre.	
		Time.	Seed/acre.	Spacing.			
Maize	X	Spring	30lb.	28″ to 3′	June	60 bus.	Concentrates.
Barley	X	Autumn or Spring	1½ bus.	7″ drill	Feb.	40 bus.	
Oats		Autumn or Spring	2-3 bus.	ditto	Jan.	45 bus.	
Peas	X	Spring	3 bus.	14″ drill	Feb.	30 bus.	
Potatoes		Spring	15-20cwt.	28″ to 30″	April	8 tons	Semi-bulky foods.
Artichokes	X	Spring	12cwt.	28″ to 30″	May	10 tons	
Sugar beet	X	Spring	4lb.	21 to 28″	May/June	25 tons	
Lucerne (green)		Autumn or Spring	20lb.	7″ or broadcast	Nov./March	15 tons	
Pumpkins	X	Spring	2-4lb.	6′ rows	March	20 to 30 tons	Bulky foods (high in Water or Fibre).
Chou moellier	X	Spring	1½lb.	28″	Feb. to June	20 tons	
Silver beet	X	Spring	2lb.	18-28″	Feb. to Apr.	20 tons	
Carrots	X	Spring	2½lb.	18 to 21″ rows	Mar. to Aug.	30 tons	
Swedes	X	Spring	1lb.	21 to 28″	May to Sept.	30 tons	
Mangolds	X	Spring	4-6lb.	21 to 28″	June/Aug.	40 tons	

The difficulty of harvesting sugar beet is one which should not be allowed to hamper the proper appreciation of this outstanding crop for pig-feeding, and where a small area only is required it will more than repay any extra labour.

Carrots are worthy of special mention, the Guerande variety having a definite advantage in that, not having a deep tap-root, it is easily pulled, and feeding out is correspondingly easier.

Swedes are an excellent crop where they can be reliably grown.

Except for mature sows and boars, ensilage is more problematical, store pigs not taking kindly to it. However, if it is sprinkled with molasses-water and supplemented with a protein concentrate, they frequently can be induced to take it readily.

In the growing of crops to supplement the dairy by-product consideration must be given to the soil conditions and other facilities for carrying pigs during bad weather. The combination of these factors may, in some cases at any rate, render the wintering of pigs unprofitable. Supplementary crops are useful in getting the pigs finished for slaughter before the winter sets in. On the other hand, where conditions are suitable it will be profitable to grow sufficient crops to enable us to have a surplus of forward stores in the spring, when prices are at their best for this class of stock. Generally, however, it will be best to limit the aims as regards wintering pigs to carrying through in a healthy and thriving condition sufficient pigs to cope with the dairy by-products available over and above those required by the sows and their early spring litters.

It is quite fair to assume that most dairy farms have some area of ground—perhaps some worn-out pig-runs—that would benefit from cultivating before re-grassing, and in the process it should be worth while taking a crop off the area. This should certainly be the case if it is possible to utilise the fertility left by the pigs in their runs.

If there is danger of this ground being infested with the eggs of pig-worms, 5cwt. of burnt lime per acre, applied before ploughing (this being fairly deep) will help to reduce the danger.

Look over the farm now, and see if you cannot find some area that can be improved by the use of the plough and which simultaneously can be made to provide for a good "kick off" for your pigs and higher net returns from pigs next year.

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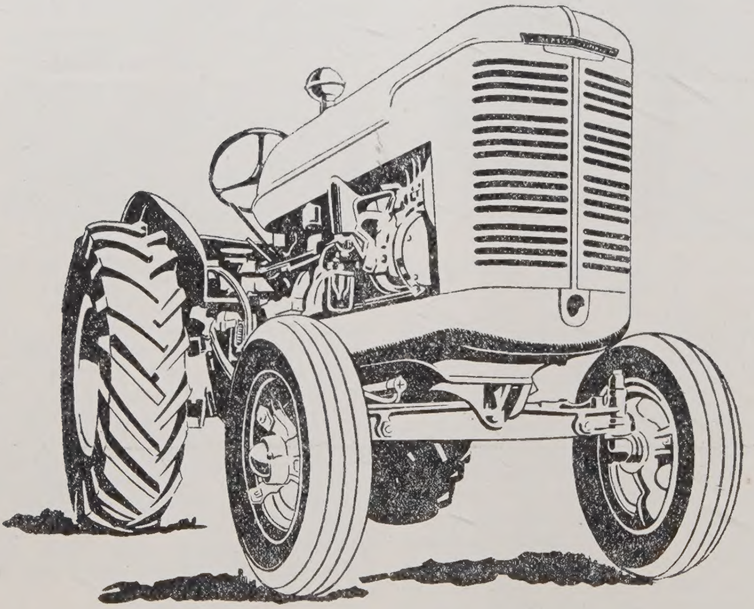

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TOPDRESSING

Results of Trials in Rotorua District

MANURING experiments in the Rotorua district indicate that all seven kinds of soil in the area must receive adequate dressings of phosphatic fertiliser before their economic utilisation for farming purposes is practicable.

By
C. R. TAYLOR,
Fields Instructor, Rotorua.

BEFORE discussing the results secured from topdressing experiments laid down in the Rotorua instructorate between 1929 and 1940 it may be mentioned that the area involved is composed of the Counties of Rotorua and Taupo, that part of the Whakatane County which includes Galatea and Te Whaiti, and the southern portion of the Matamata County, namely, Putaruru, Lichfield, and Tokoroa, etc. Within this area the main kinds of soil as recognised and mapped by Dr. L. I. Grange, Scientific and Industrial Research Department, are seven in number and are derived from the following deposits of volcanic ash:—

"Taupo" ash-shower.
"Kaharoa" ash-shower.
"Rotomahana" (mud) ash-shower.
"Tarawera" ash-shower.
"Mamaku" ash-shower.
"Rotokawau" ash-shower.
"Ngauruhoe" ash-shower.

Object of Trials

Topdressing experiments aimed at securing information regarding the behaviour of the various phosphatic fertilisers, potash, and lime have at different times been laid down on all but two of the above kinds of soil. Experiments have also been carried out on nitrogenous fertilisers to some extent, but these were not continued for long owing either to their unfavourable reaction on the pasture sward (sulphate of ammonia) or to their uneconomic nature (dried blood and blood and bone, etc.). When used regularly for topdressing, organic manures were often observed to produce a growth which was decidedly unpalatable to stock. Nitrogen, where deficient and therefore necessary, was found to be best introduced through the agency of clovers—especially certified white clover—which grow luxuriantly following applications of suitable types of phosphates.

In general, the type of topdressing experiment conducted is what is known as the L.P.K. trial—"L" standing for lime, "P" for phosphorus, and "K" for potassium. The element phosphorus is represented by such fertilisers as superphosphate and basic slag, while potassium is represented by 30 per cent. potash salts. Each trial was laid down in duplicate to avoid as much as possible any slight variation in soil conditions, and the arrangement of each series was such as to give eight different plots treated as follows:—

1. No manure (check or control plot).
2. Superphosphate.
3. Super and potash.
4. Potash.
5. Lime.
6. Lime and super.
7. Lime + super + potash.
8. Lime + potash.

The quantities of fertilisers and lime used when laying down a trial are as follows:—(1) Super, 3cwt. per acre, (2) 30 per cent. potash salts, 2cwt. per acre, and (3) carbonate of lime, 1 ton per acre. In subsequent annual topdressings there was no variation in the rates of fertilisers but lime was reduced to 5cwt. As the majority of trials were down for between three and four years and regularly topdressed each autumn the total amounts of fertilisers and lime received by each of the respective plots were:—

(1) Lime, 35cwt.
(2) Super, 12cwt.
(3) Potash, 8cwt.
On basis of four years.

In addition to L.P.K. experiments a number of other types had for their objectives a comparison between the following fertilisers, all being applied at 3cwt. per acre, and superphosphate:—

1. Heskett slag.
2. Basic slag.
3. Basic super.
4. North African phosphate.
5. Finely-ground Nauru phosphate.
6. Seychelles guano.
7. Serpentine super.
8. Heavy dressings of super (½-1 ton per acre).
9. Blood and bone (3cwt. per acre).
10. Sulphate of ammonia (1-2cwt. per acre).

Due to war conditions and consequent acute shortage of staff it is unfortunate that the serpentine super type of experiment has not been laid down long enough, except in two instances, to enable a general pronouncement to be made concerning its efficacy. Moreover, only a relatively few of the several soil types have officially been tried out with serpentine super up to the present. Such results as are available, however, will be indicated later.

For the most part, all experiments were regularly inspected and reported on at quarterly intervals, but during recent years and entirely on account of the war many have had to be closed down, and for the remainder half-yearly inspections were substituted.

Inspections

Inspections took the form of visual observations—that is, all that the trained eye could detect was duly recorded season by season. On closing the trial—usually after three or four years—all the recorded details were carefully studied and summarised, the final result producing a reasonably accurate picture of the economic worth of a particular fertiliser or combination of fertilisers and lime in respect of any specific soil type.

Naturally, the whole story of a pasture's response to various fertiliser treatments cannot be told merely from visual observations, and no claim is made to this effect. The soil's complexity is, as yet, too vast for present-day knowledge to unravel satisfactorily even with the aid of chemical analysis, but by carefully noting certain features of a pasture's appearance and composition throughout the four seasons of the year it is possible to arrive at a conclusion not very far removed from actual truth. These features are as follows:—

1. The relative growth of pasture throughout all seasons.
2. The rapidity of recovery following grazing.
3. The improvement in sward composition. For example, the content and kind of grass and clover species and the proportion one bears to the other.
4. The proportion of weeds present, especialy flat weeds such as catsear, plantain, and cudweed, etc.
5. The density, colour, and general appearance of sward.
6. The preference, if any, shown by the grazing animals. This is most important.

With this brief outline of the experimental work so far conducted in the instructorate readers will be in the position to appreciate better the significance of the observations to follow.

TOPDRESSING RESPONSES.

Taupo Ash-shower

The Taupo ash-shower comprises the most widely distributed soil type within the instructorate and covers to an approximate depth of 6 inches or more all the territory south of a line drawn between Putaruru, Mamaku, and Whakarewarewa Reserve (Rotorua), except for a small area covered by the Ngauruhoe ash-shower around the southern portion of Lake Taupo and a similarly restricted belt of Kaharoa ash on the Kaingaroa Plains and Galatea district. Thus, the main farming districts of Putaruru (south), Tokoroa, Mamaku, Ngakuru, Horohoro, Atiamuri, and Reporoa all have a surface soil of common origin modified only by their distance from Lake Taupo (source of parent material of the soil) and such natural features as swamp conditions and vegetative covering, etc. In all, the Taupo ash-shower covers 8,800 square miles, about half of which falls within the boundaries of the instructorate.

In texture the top soil of Taupo ash as it affects present-day farming areas and much undeveloped land suited to rural pursuits is classified as a sandy silt. It is creamy-white in colour, except for a few inches near the surface which have been darkened by the accumulation of humic material. In chemical properties it is deficient in phosphorus, nitrogen, and, to a varying extent, cobalt.

Without suitable fertilisers Taupo ash will grow little or nothing of economic value apart from exotic trees such as *Pinus radiata*, etc. Following regular dressings of certain phosphatic fertilisers, however, it will carry first-class pastures of the ryegrass-cocksfoot-white clover type without difficulty, provided management is reasonable.

Topdressing experiments have been numerous on this soil type, and all have demonstrated a lack of useful

Challenge

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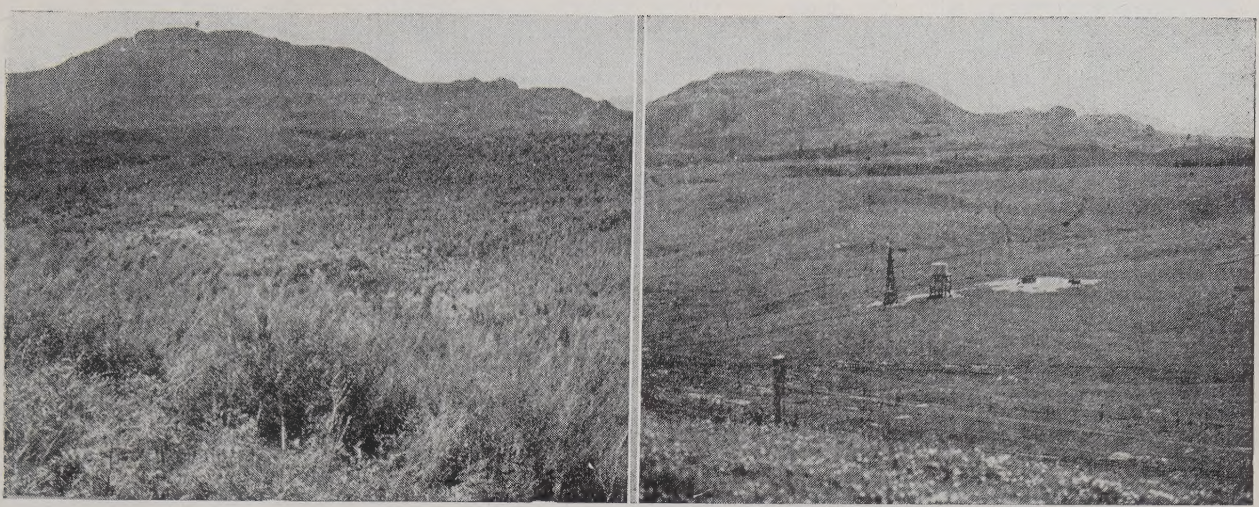


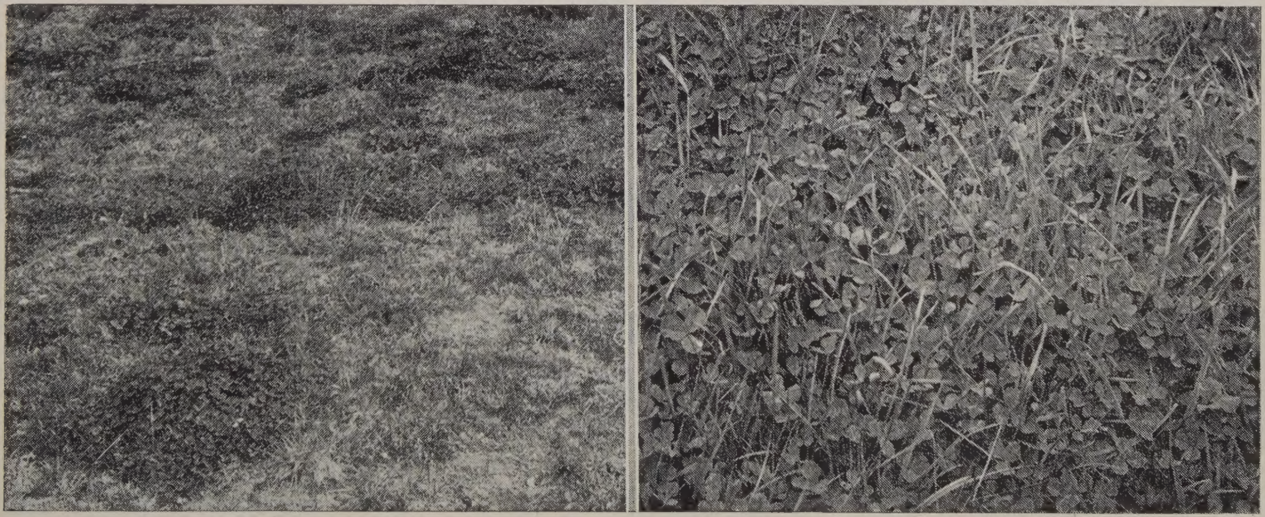
Left.—Typical appearance of country represented by "Taupo" soil while still in its native state. Note the stunted vegetation, which largely results from a nitrogen deficiency. Right.—The same view of the scene after development. Note the prolific white clover growth in the foreground following dressings of superphosphate.

response to lime and potash when applied at rates indicated earlier in this article. In a number of instances lime has actually been noted to bring about a certain harshness in the appearance of a pasture sward, while on other occasions it has made the herbage distinctly unpalatable to stock. In most cases, however, lime has simply no visible effect on pasture growth or composition.

Of all the phosphatic fertilisers under experiment, superphosphate has given the most consistent and reliable response. Basic slag has in some years been found equal to superphosphate — seldom superior — and never quite as reliable. A 50 : 50 mixture of superphosphate and slag produced most pleasing results at all times. Responses to Heskett slag, North African phosphate, and Nauru phosphate have always been most disappointing, and these fertilisers cannot be recommended. To Seychelles guano the response has been patchy and never equal to superphosphate or basic slag. Serpentine superphosphate has not been sufficiently tried out officially to warrant comment at this stage except to remark in passing that many farmers in the Putaruru-Tokoroa district have indicated their preference for this type of fertiliser for both topdressing and cropping.

Several large-scale topdressing experiments laid down in the Ngakuru district to determine the payability of heavy dressings of superphosphate (up to 1 ton per acre) yielded negative results—negative in the sense that nothing above 3cwt. per acre annually was payable on well-established pastures. On newly-established grass areas, however, the practice of using 3cwt. of superphosphate at the time of sowing the seed and a further 3cwt. about 4 months later was found to give optimum results.

Trials designed to eliminate the initial nitrogen deficiency incidental to this soil type by means of ammonium sulphate and organic manures proved neither really successful nor payable. Such fertilisers, especially the organic type, were very suitable for cropping when added to



Left.—A poor strike of clovers in a permanent pasture laid down on "Taupo" soil. Note the vigorous growth of odd clumps of red and white clover and the poor vigour of the grass species where clover is lacking, indicating nitrogen starvation. Right.—Similar permanent pasture mixture sown at the same time and on the same soil type. A good strike of clovers was followed by a vigorous growth of ryegrass and cocksfoot, illustrating the ability of clovers to "make good" quickly a nitrogen deficiency in soil. Both pastures were sown with 3cwt. of super per acre.

superphosphate and mixed with the soil, but for pasture production it was found that white clover, which followed dressings of superphosphate and basic slag, etc., provided all the nitrogen the grass species required.

The third mineral element deficient in the Taupo ash soil, namely, cobalt, is very easily supplied in adequate quantity by topdressing annually with cobaltised superphosphate or cobaltised serpentine superphosphate. So far as is known this element does not in any way influence pasture growth, but its presence in the herbage is vitally important to the health and productivity of livestock. The lack of cobalt in a pasture is the cause of a wasting condition known as "bush sickness" in ruminant animals.

Kaharoa Ash-shower

Soil derived from the Kaharoa ash-shower is not continuous throughout the instructorate owing to the volcanic eruption of 1886 superimposing a layer of Rotomahana "mud" and Tarawera ash over the central part of it. Thus, there exist today two distinct localities possessing soils of a common origin, namely, Kaharoa and Galatea districts, separated by 40 miles as the crow flies or 70 miles by road.

To the north-west of Rotorua at Kaharoa and Te Pu the texture of this soil is classified as a coarse, gravelly sand, averaging in depth from 9 inches to 12 inches. At Galatea, however, it fines down to a sandy silt from 4 inches to 6 inches deep, due to the greater distance of this district from the point of volcanic eruption. In the Kaharoa-Te Pu area especially, the soil is very darkly stained by an accumulation of organic material. This is all to the good, for it greatly assists in the retention of moisture, facilitates the reaction of artificial fertilisers, and is itself a potential plant food in that when finally decomposed into humus it becomes a rich source of nitrogen.

Kaharoa pumice soil lacks natural fertility in being deficient in phosphorus, nitrogen, and cobalt. Experience in the Kaharoa district has shown that pastures respond excellently to superphosphate, basic slag, and serpentine superphosphate—in fact, it is difficult to differentiate between them. To lime and potash there is no useful response, lime sometimes having the effect of making a pasture unpalatable to stock. Responses to Heskett slag, North African phosphate, and Nauru phosphate have been impressively poor at Kaharoa, but have not been officially tried at Galatea. Similarly, no trials involving serpentine superphosphate have been laid down at Galatea, but superphosphate and basic slag are known to do well there.

This soil type greatly belies its appearance, for it will grow cocksfoot and the clovers to perfection, and will withstand prolonged periods of dry weather without losing its green freshness. When once adequately topdressed it has a good carrying capacity, and dairying and fat lamb raising can be practised quite successfully.

With regard to the nitrogen and cobalt deficiencies, the same conditions as on the Taupo ash-shower obtain.

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A small part of the Ngakuru district developed by the State in 1930-33 on "Taupo" soil. Originally broken in from native vegetation, this area is now in first-class pasture. Note the abundance of white clover. Pasture sown down with 3cwt. of super and followed in four months with an additional 3cwt. Subsequent topdressing 3cwt. of super annually.

Rotomahana "Mud" and Tarawera Ash-shower

These deposits were erupted from Tarawera Mountain and adjacent lowland craters during the eruption of June 10, 1886. Ash from the mountain was blown in a north-easterly direction, all of which fell outside the instructorate apart from a relatively small, and so far unimportant, farming area in the north-east corner of the Rotorua County. No experimental work has as yet been carried out on soil derived from Tarawera ash in this district, as most of the area involved is still in native bush.

Soil derived from Rotomahana "mud" is, however, important, although the actual area within the instructorate probably does not exceed 240 square miles, half of which is being intensely farmed, the balance either planted in exotic forests or still in native vegetation. Roughly, the area affected by this ash-shower lies along the eastern shores of Lake Rotorua, extending in the north to beyond the Rotorua County boundary and in the south to Rainbow Mountain. Its other boundary lies approximately 12 miles still further to the east, and is formed by a gradually sweeping line drawn through the centres of Lakes Rotoiti and Tarawera and extending in a south-easterly direction to the northern part of Lake Rerewhakaitu.

This soil is extremely fine in texture and is classified as a loam. It is light grey in colour, and owing to its youth is deficient in organic matter. It also lacks phosphorus, nitrogen, and possibly, to some extent, potassium. Cobalt does not appear to be deficient. Topdressing experiments fail to suggest that lime plays any useful part in the production and maintenance of pastures, but there is some evidence that potash applied every two to three years at the rate of 2cwt. 30 per cent. potash salts per acre in addition to phosphates is advantageous. Superphosphate has given consistently good results, while basic slag has not been far behind. Serpentine superphosphate has not so far received experimental attention on grassland, but splendid crops of carrots and swedes were grown last season at the State vegetable farm, Te Ngae, with less than 2cwt. per acre. Heskett slag and the other less soluble types of phosphatic fertilisers are still untried. The nitrogen deficiency is quickly remedied through the agency of clover growth.

The farming districts substantially influenced by this soil are Ngapuna, Te Ngae, Ṭikitere, Okareka, and part of Rerewhakaitu, all of which are capable of carrying first-class pastures of the ryegrass-white clover type following adequate topdressing. Because of the soil's fine texture—almost a clay—these localities are inclined to parch a little after a long dry spell, and for the same reason the land is somewhat difficult to cultivate if the soil is wet. Nevertheless, the soil is excellent from a farming viewpoint.

Mamaku Ash-shower

Soil derived from Mamaku ash-shower occupies only a limited area of the instructorate, and extends in a north-westerly direction from its point of contact with the Rotomahana "mud" just east of Rotorua Borough to beyond the Rotorua County boundary a mile or two north of Mamaku. The area covered is roughly rectangular in shape, with an average width of only four miles. The borough of Rotorua, together with most of the area immediately surrounding Mt. Ngongotaha and extending to Tarakenga and the north end of the Oturoa Road, are well-known districts falling within the scope of this soil type. Most of the affected area is still in native bush, but there are a few highly developed farms in the vicinity of Rotorua, Clayton Road, and Fairy Springs which can be taken as a fair measure of the farming potentialities of the remainder of the area.

The Mamaku ash-shower has a texture classified as a fine sand, and in colour it is distinctly brown. It is naturally of low fertility, being deficient in phosphorus and nitrogen and, to some extent, cobalt. Lime and potash have each failed to give a useful response. Superphosphate responded well over the four years

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the experiment was under observation, while basic slag was not far behind. North African phosphate gave a poor response at all times. Serpentine superphosphate has not been officially tried on this soil type up to the present, but it is hoped to make arrangements to do so in the near future.

The nitrogen and cobalt deficiencies are easily corrected as previously explained.

Pasture on "Kaharoa" soil topdressed with basic slag. Outside of fence not topdressed.

Rotokawau Ash-shower

In the main, soil derived from Rotokawau ash-shower is now covered up by the Kaharoa and Tarawera soils, but it still remains the surface soil over a very limited area in the Ngongotaha district. It lies as a narrow strip between the Mamaku and Kaharoa soil types, the approximate boundaries being the Ngongotaha-Auckland road and the Waiteti Stream and extending for roughly 12 miles in a north-west direction from the shores of Lake Rotorua.

On weathering, this soil becomes a dark brown colour, while its texture closely resembles a loam. In this latter respect it is not unlike Rotomahana "mud" soil, which probably explains its reputation as a farming centre of some merit. Like all the pumice soils already described, this one is equally deficient in phosphorus, nitrogen, and, to some extent, cobalt. Experiments have not definitely demonstrated the need for lime, but there is some evidence that ryegrass is strengthened by moderate applications of lime in some circumstances. However, much more work is necessary to clear up this point. Potash responses have been negligible.

Of the phosphatic fertilisers experimented with, superphosphate always gave a very good response, but basic slag appeared somewhat unreliable. A 50 : 50 mixture of superphosphate and slag, however, gave excellent results. The results from North African phosphate were so poor that this fertiliser cannot be recommended. Heskett slag and serpentine superphosphate have not been tried out. Nitrogen and cobalt deficiencies are best made good through the agency of white clover and cobaltised fertilisers.

Ngauruhoe Ash-shower

Soil derived from the Ngauruhoe ash-shower affects the Rotorua instructorate only to a slight extent in the vicinity of Tokaanu at the south end of Lake Taupo. Prison farms at Hautu and Rangipo are located on this soil, as are also large blocks of native land at present under development by the Native Department. The deposit, which occurs within a circular area of approximately 30 miles radius of Mt. Ngauruhoe, is andesitic in composition, and has a texture described as a sandy silt. It is of low natural fertility in common with all the other volcanic ash-showers described, being deficient in phosphorus, nitrogen, and probably, to some extent, cobalt.

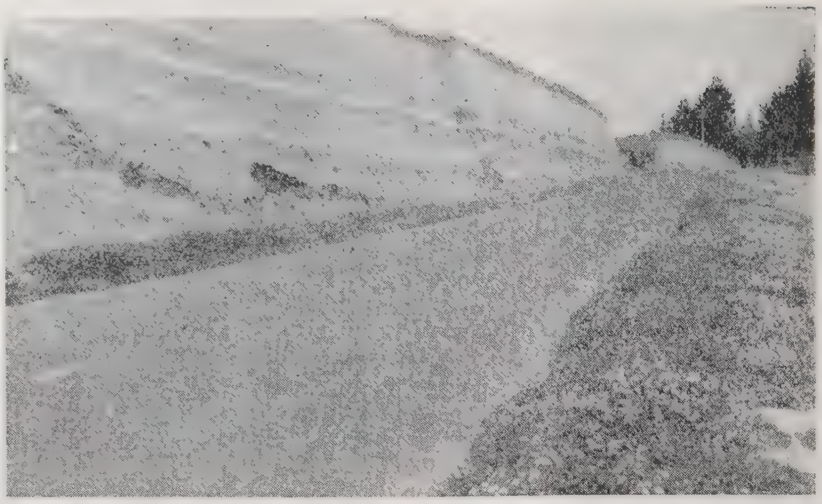
Judging from a comprehensive series of topdressing trials laid down on the Rangipo Prison Farm it appeared fairly conclusive that weight for weight there was little difference between superphosphate, serpentine superphosphate, and basic superphosphate—all gave very good responses on an indifferent pasture sward that had been inadequately topdressed for many years. On the other hand, the use of similar quantities of Heskett slag gave most disappointing results, so much so in fact that after three years' trial with annual dressings up to 3cwt. per acre it was only just possible to discern a slight improvement in the sward. There was no response to lime, and potash was not tried out owing to wartime scarcity of this fertiliser.

In the main, this soil seems capable of carrying quite a good pasture, but it must be given regular and sufficient dressings of a suitable phosphatic manure to encourage clover

Close-up of "no manure" strip around serpentine super trial on "Kaharoa" soil. Note the lack of clover, bare patches in a weak grass sward, and encroachment of flat weeds.

Milking Machine

cleaning and maintenance are treated in Bulletin 118, available *free* from offices of the Department of Agriculture. Hints on prolonging the life of rubberware will be found particularly useful in these days of shortage of materials.



A pumice soil profile one mile east of Ngongotaha along the Rotorua-Auckland road. Of particular interest is the wealth of white clover growing on raw subsoil pumice after a light dressing of super. Clover and grasses were sown in an attempt to prevent erosion of road edges.

growth and thus indirectly provide the nitrogen which is so essential to the health and vigour of the grass members of the pasture sward. If cobaltised superphosphate or cobaltised serpentine superphosphate are used, so much the better, for should there be a deficiency of cobalt—and it is suspected in some degree—then it will be automatically corrected by the use of one or the other of these fertilisers.

Conclusions

All of the seven kinds of soil comprising the instructorate must receive adequate dressings of a phosphatic fertiliser before their economic utilisation for farming purposes is practicable.

Superphosphate has so far given the best response, with basic slag not far behind. Serpentine superphosphate shows definite promise on certain soil types, but to date insufficient work has been done with it to justify even a general statement covering its prospects. Of the less soluble types of phosphates such as North African and Nauru phosphate, and possibly Heskett slag, little can be said to their advantage from the data available.

As none of the soils has responded to relatively large quantities of lime it is difficult to see how the small amounts commonly applied by farmers, often at irregular intervals, stand much chance of doing good. Actually there is nothing unusual about this lack of response to lime, for immature soils—and all the volcanic ash-soils described are immature—have not been deprived of their base elements through leaching to nearly the same extent as the older soils. Moreover, substantial quantities (up to 50 and 60 per cent.) of lime in one chemical combination or another are applied to soils with every application of superphosphate, basic slag, etc.

With the exception of the Rotomahana "mud" soil, it appears that no good purpose is being served by dressings of potash manures. These are invariably costly to purchase, and until more is known concerning their use in grassland management farmers would be well advised to spend the extra money on additional phosphates.

Nitrogen, although initially deficient in all soils described, is best supplied indirectly through the agency of clovers, especially certified white clover.

The trace element, cobalt, is deficient in varying degree in most of the soils comprising the instructorate, and the need for making good this deficiency should not be overlooked. Cobaltised phosphates can be thoroughly recommended as a means of correcting this deficiency.

◆

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STUDIES IN FARM MANAGEMENT

A Waipa Dairy Farm

THE Middle Waikato Basin, comprising the Hamilton Basin and the Hauraki Lowland, is a land of dairy and stock-fattening farms. The general features of the district were described in the May, 1945, issue of the "Journal" in the introduction to the study of the farm management methods on a farm devoted to the production of fat lambs in Waipa County. This article describes the farm practices on a 50-acre dairy farm in Waipa County on which a small flock of ewes for fat lamb production is a profitable sideline.

By

A. T. SHANNON,

Field Economist, Hamilton.

THE history of many 50-acre blocks in the Waikato dates back to the Maori Wars of the '60's, following which allocations of these parcels of land were made to the disbanded militia to settle soldiers in the district. In recent years, and particularly now, farms of this size are in demand as one-man propositions. This article describes the progress made over the past 15 years on a farm of this size as a means of illustrating the possibilities, and also discusses current farm practice.

Situated within a few chains of the lower Waipa River, the farm of Mr. Warwick Adams is conveniently placed 4 miles from Ngaruawahia, 11 miles from Hamilton, and within 2¼ miles of the New Zealand Co-operative Dairy Company's cheese factory at Te Kowhai. The greater part of the farm comprises a brown sandy loam named the Horotiu sandy loam, together with a clay loam derived from volcanic ash and known as Hamilton clay loam. Apart from peat, these are the two principal types of soil occurring in the northern part of the Hamilton Basin and support the ryegrass and white clover pastures which have made the Waikato an outstanding dairying district.

Drainage on this farm with these soils presents no problems. On one side is a lagoon comprising part of the Otamanui Creek, with a fall of about 20ft. from the greater part of the paddocks, and on the other side are further gullies which ultimately reach down to the Waipa and drain a wide area. The district is slightly undulating between deep gullies. There is ample water supply on the farm except for two paddocks, water from a permanent spring being pumped to concrete troughs. There being no lack of underground water, it is proposed to put down a bore to supply the remaining area, which at present carries sheep, which are sufficiently watered from the swamp part of a gully.

As a young man of 20, Mr. Adams started out to farm on his own against the advice of many who considered that youth and inexperience were against him. At that time he had spent two years on a Raglan sheep farm, and for a further year he had been sharemilking. His only assets were £60 in cash and a motor-bike. It is understandable that when he purchased nearly 100 acres as a going concern at £32 per acre he found himself with six mortgages on the land at rates between 6 per cent. and 7½ per cent., and the 33 cows were under bill of sale. Incidentally, the entire £60 was swallowed up in conveyance and legal fees. These commitments involved annual charges of more than £200. As a young and energetic man, not then married, Mr. Adams saw the possibilities of this farm, even though it had changed hands seven times in the 10 years prior to his arrival.

The farm had been sadly neglected. Years ago it had been the scene of historic battles between the local Maoris and Taranaki invaders—all the evidence of breastworks, trenches, and kumera pits still remains. Following the coming of the pakeha the district had been farmed in large blocks, but the value of the land for dairying was realised early. In fact on the property there still stands in first-class preservation one of the first dairy factories in the Waikato. With this background, outstanding mortgages, and a legacy of gorse and blackberry, Mr. Adams launched out in the season which ushered in the great depression.

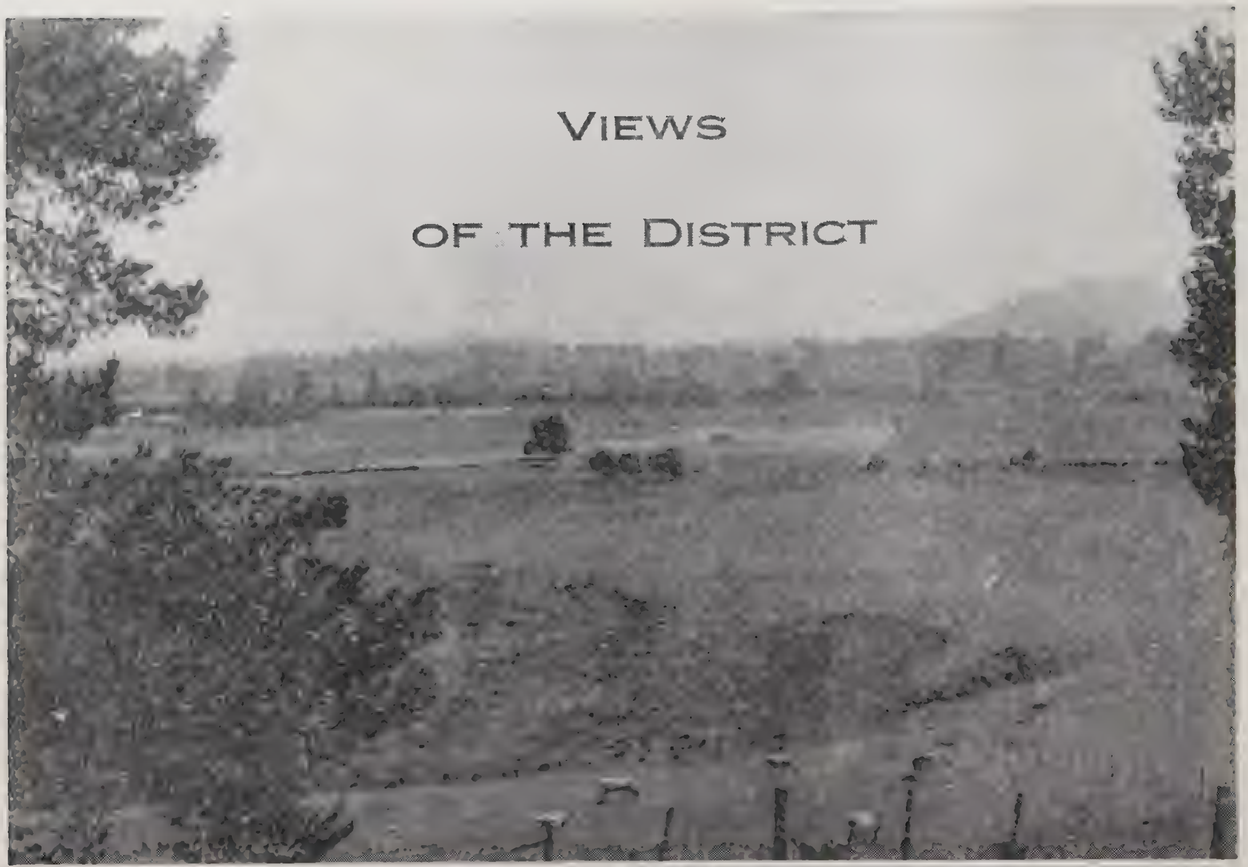
"The first thing to greet me," remarked Mr. Adams, "was a request from the County Council to clean up the gorse on the road frontage or else. . . . Gorse is troublesome; you have to keep on grubbing, and it will turn up years afterwards in a newly-ploughed pasture. Fencing was most necessary for proper control of the grass. You will see that on the 50-odd acres I have now there are 13 main grazing paddocks and 4 others, and that has made it possible for me to improve the grass by controlled grazing and concentrated stocking. In the first season, in spite of the financial burden, I spent £38 on fertiliser, and got results, because the grass growth carried the stock better. The treading and crushing helped to kill out the young gorse and blackberry."

These sound ideas, however, did not serve to arrest the depression. In that first season 33 cows returned 7,490lb. butterfat and receipts were:—

	£
Milk	369
Pigs	31
Calves	6
Cull cows	5
	£411

VIEWS

OF THE DISTRICT



Payments amounted to £413, interest and rates accounting for well over half this amount. The disastrous fall in butterfat prices next season forced Mr. Adams to sell almost half the farm and to concentrate on just over 50 acres.

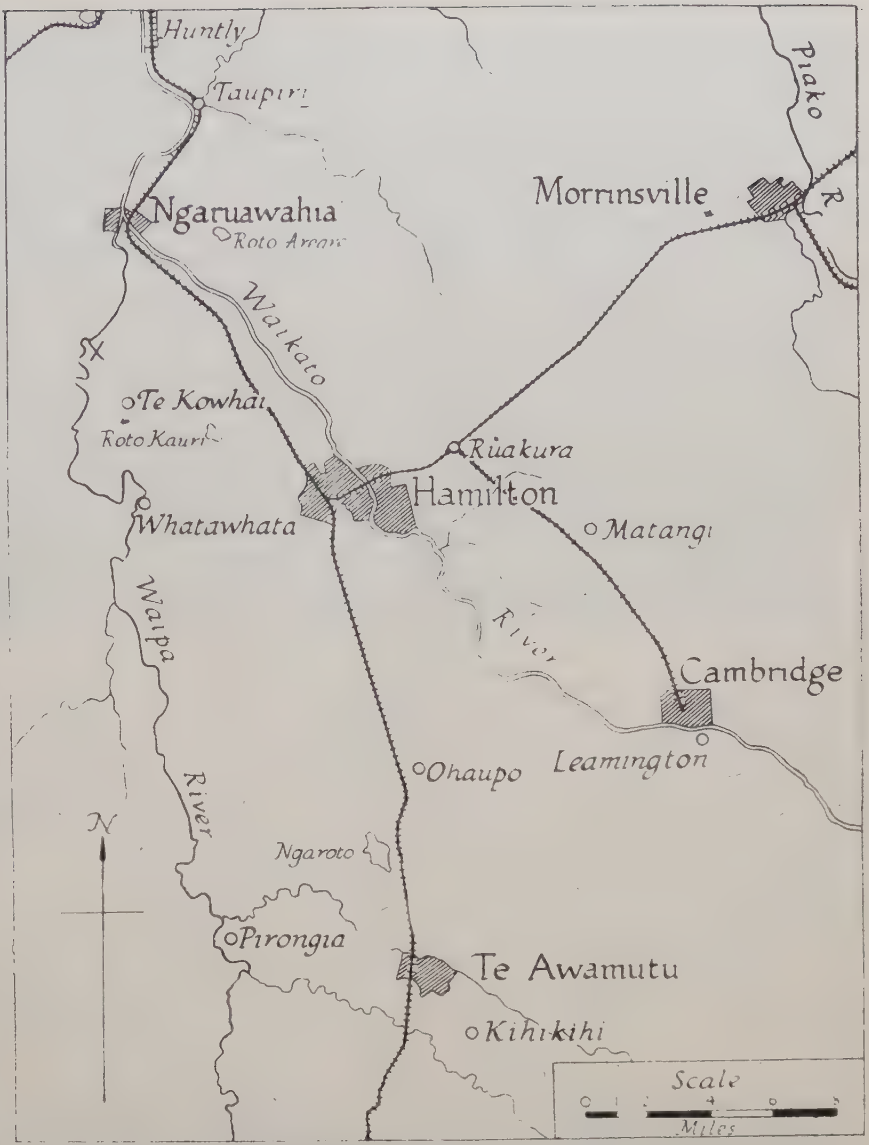
That Mr. Adams has been successful in his farm management will be seen from the fact that the farm still carries 33 cows, averaging just under 8,000lb. fat over the past five seasons, there are 50 breeding ewes, and the farm is now financially unencumbered.

Replacement Policy

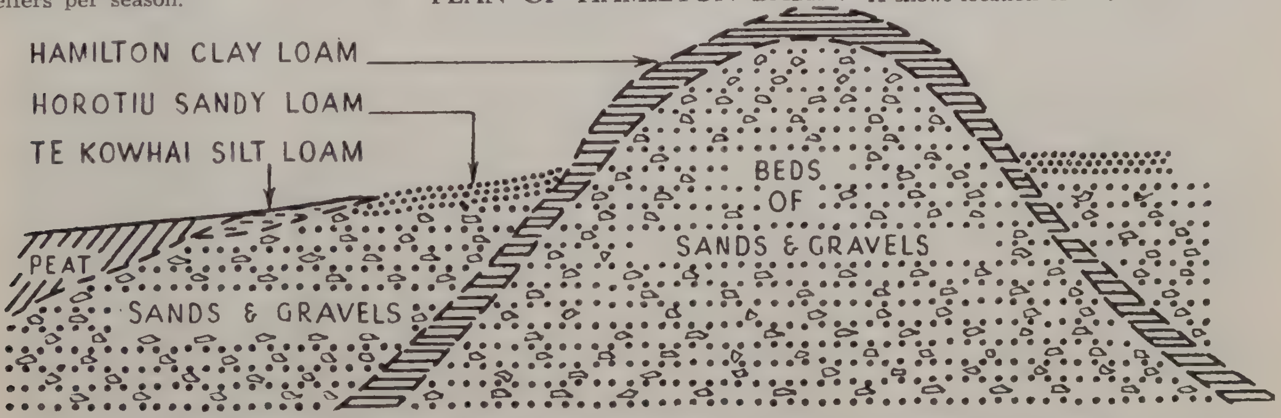
This carrying capacity has been maintained partly by buying all replacement stock in recent times. "I used to have pedigree bulls when I bred calves before the factory changed over to cheese production," Mr. Adams said, "but I found that on a one-man farm, where time is short and every acre has to be made to pay full dividends, it was a better proposition to buy my replacements. This was definitely the case with only whey instead of skim-milk to rear the calves on. At the present time, selling all calves, any bull will do as long as it gets the cows in calf.

"My experience has been that unless you buy dairy stock from known sources, it doesn't pay, as you are bound to pick up a lot of someone else's rejects. I get my replacements now from a neighbouring sheepfarmer who rears from selected weaners and yearlings. For a small farm it is best to buy well-developed springing heifers. Be sure they are well forward in calf, preferably on the drop, otherwise you will get caught with slips."

Replacements call for up to six heifers per season.

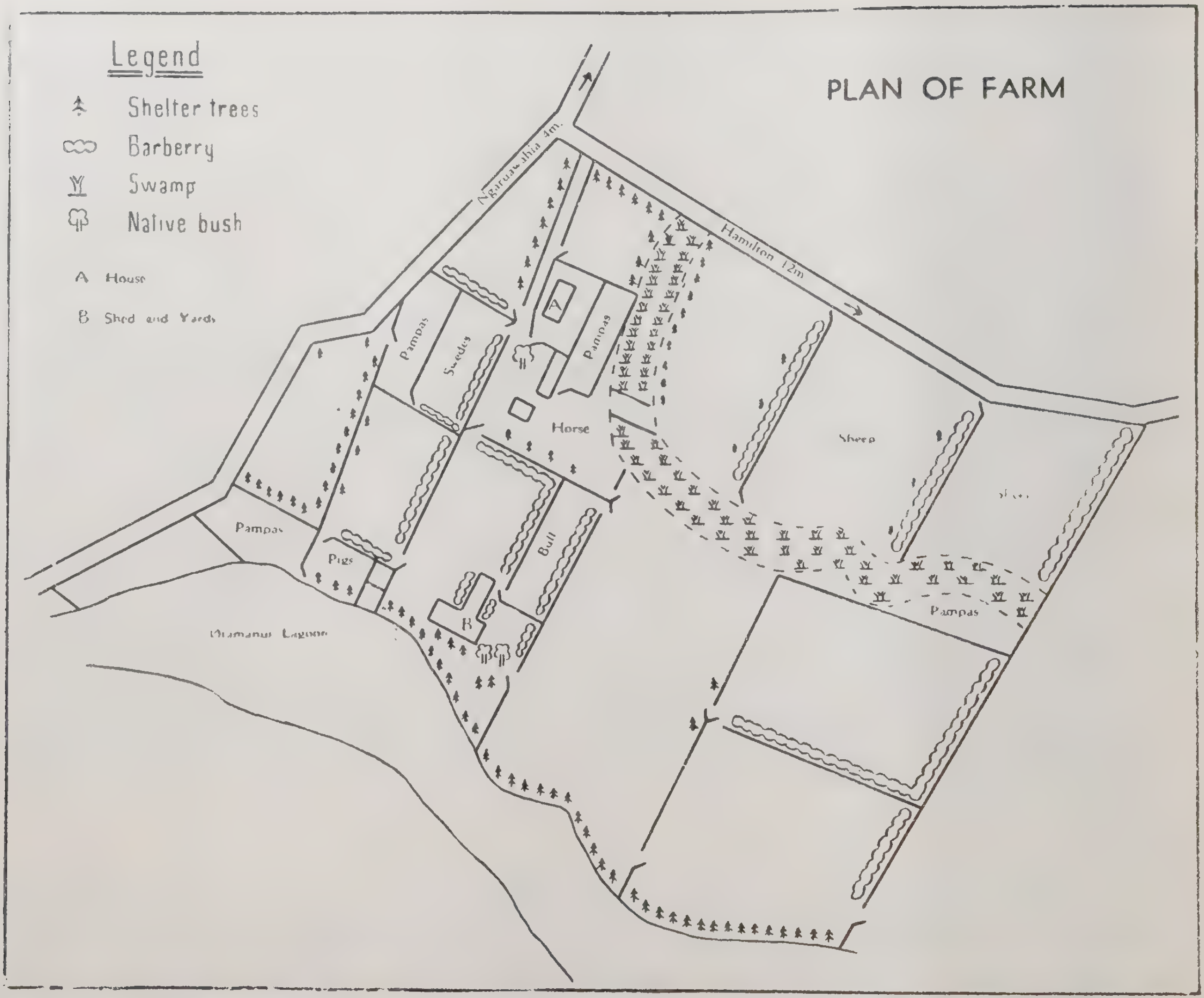

Huntly
Taupiri
Piako
Morrinsville
R
Ngaruawahia
Roto Arcau
Waikato
X
Te Kowhai
Roto Kauri
Ruakura
Hamilton
Whatawhata
Matangi
Waipa
River
River
Cambridge
Leamington
Ohaupo
N
Ngaroto
Pirongia
Te Awamutu
Kihikihi
Scale
Miles

PLAN OF HAMILTON BASIN. **X shows location of Mr. Adams's farm.**


HAMILTON CLAY LOAM
HOROTIU SANDY LOAM
TE KOWHAI SILT LOAM
PEAT
SANDS & GRAVELS
BEDS OF SANDS & GRAVELS

DIAGRAMMATIC OUTLINE OF ARRANGEMENT OF SOILS OF HAMILTON BASIN.

SOIL TYPES IN RELATION TO TOPOGRAPHY AND PARENT MATERIAL: The Hamilton clay loam, derived from volcanic ash beds which settled from the air following an eruption, occur on the low hills scattered throughout the Waikato farmlands. The other soil types, located on the flats above which the hills rise, are formed from water-laid silts, sands, and gravels. Horotiu sandy loam is found on the slightly higher ground of the flats, Te Kowhai silt loam in slight depressions, and peat in low-lying areas that have been partially filled with beds of moss, sedge, etc.


PLAN OF FARM
Legend
Shelter trees
Barberry
Swamp
Native bush
A House
B Shed and Yards
Ngaruawahia 4m.
Hamilton 12m
Pampas
Swedes
A
Pampas
Horse
Sheep
Sheep
Pampas
Pigs
Bull
B
Pampas
Ohumanui Lagoon

The Dairy Herd

Disease

Experience with disease affords a typical example of the sudden high incidence of one of the principal troubles which prove so exasperating and puzzling. Mr. Adams has had little trouble with mastitis, but last season sterility made its appearance. The first bull had an accident and time was lost in the beginning in getting the cows in calf. The next bull proved sterile, but the third was successful. This year it has been necessary to have three more bulls before obtaining final success. The feeling is that the bull-testing service provided by the Department of Agriculture is really valuable. While it does not guarantee that cows will be got in calf, it does at least show which bulls are sterile, and can give a useful indication of the potency of sires.

Production got away to a slow start, but now has more than caught up on the same period last season.

Some years back another typical set-back to the dairy farm came when 13 cows aborted in one season and 12 in the next. Mr. Adams believes in refraining from interfering in calving and lambing troubles until absolutely necessary, in the belief that it is best to let Nature take its course. At the same time it is essential to know when to take action. Recently, for instance, a sow was allowed to farrow in the pampas, and has a beautiful litter of 10 in consequence.

Sheep

The use of sheep on the farm illustrates a growing practice amongst dairy farmers. "I bought sheep originally to help in clearing up the gorse and blackberry, and now the idea is to follow up the cows when it is necessary to clean up any rough paddocks. Unquestionably some of my grass would otherwise have to go to the plough much earlier, if it were not for this. For the most part the ewes are kept on those two paddocks of 12 acres where there is no pumped water, unless feed gets away elsewhere and needs controlling.

"Sheep come second on the farm. I buy in aged ewes each year, take a crop of lambs, and then sell the ewes fat. The sheltered 2-acre paddock near the house is the one I shut up for a bite of good fresh spring grass on to which the ewes are shifted just before they lamb. Of course, in a late season, when the spring grass for the calving cows is not coming on too well, the ewes won't go into that 2 acres. They have to do as well as possible elsewhere. I get just over 100 per cent. lambing, aim to sell the fat ewe at her original cost or better, and get the wool and fat lamb for profit. Last year I bought 50 ewes at 11/3, lost 7 or 8 from natural causes and lambing, and sold them at about 14/-. Wool fetched about 8/-, and the lambs returned 21/- net. I am fortunately placed in being able to shear at a neighbour's shed."

Pigs

A further sideline is in the pigs, though Mr. Adams has little time to give these all the attention required for whey feeding. Feeding five times per day is apt to prove a handicap, especially during harvesting. Last season was a very successful one. Selling principally as buttermilk pigs, Mr. Adams secured £54 from one sow and nearly £30 from the other, with less than £4 for the cost of meal. Part of the success is doubtless in the breeding stock, the sows being put in pig to the Mountley stud, which is only a few miles away.

Pastures

Very noticeable in an inspection of the farm in February is the strong growth of paspalum, which shows excellent growth during the dry months and up till March. There is no evidence of paspalum taking charge on this farm, though in neglected areas in the locality it completely dominates other grasses at the present time.

In discussing his pastures Mr. Adams remarked, "I am a firm believer in paspalum, with clover and ryegrass, and run the chain harrows over the farm to spread the manure and control the paspalum. I don't go in for tough harrowing with tines, because it brings the weeds, especially ribgrass.

"Some time prior to rationing of fertiliser I got really excellent results by using a mixture of potash, Nauru phosphate, and superphosphate at 3cwt. to 3¼cwt. over the whole farm each year. I have used blood and bone too, to get rather more lasting results. The remarkable thing about the reduction in fertiliser is that it has not brought the fall in production I expected. There has been no reduction in stock from that cause. Normally I spread 8 tons of lime each year at half a ton per acre. Once I used burnt lime and got good results, but the handling is the trouble. I have ordered 12 tons this year, but may not get all of it."

If it is possible, topdressing is done in February, late summer or early autumn being preferred to get growth in late autumn and early winter. If the fertiliser does not arrive in time this year, it is proposed to hold it over until spring, when climatic conditions will promote growth, the feeling being that much fertiliser is lost in the soil

VIEWS OF THE FARM

Right—Pampas grass.

Above—The cowshed and sheepyards.

Left—Maize.

during the period of no growth. If conditions permit, hay paddocks get a spring dressing just prior to closing up.

Asked about his grass mixture, Mr. Adams emphasised the use of certified seed. "Actually I rely on my produce firm to make up the mixture that their experience has shown to be successful in this district. It is principally ryegrass and clover, of course, and includes cocksfoot, timothy, and *Lotus major*. Incidentally, I always test the seed myself before sowing, by germinating some between damp blotting paper or flannel. I sow at 40lb. per acre, but for the past three seasons no new grass has been sown, because I have gone in for pampas instead."

Pampas

Pampas is a feature of the farm which provides a striking demonstration of the possibilities of this comparatively recent innovation. One out-of-the-way half acre on a small terrace near the lagoon had been cropped with swedes, and in the following September 500 plants of McLean's pampas were put in, this being done comfortably between milkings. The plants are put in slanting away from the prevailing wind and at 6ft. intervals. A good 90 per cent. is an average strike, and no fertiliser is required. To control the weeds at the early stage Mr. Adams sows maize, potatoes, and kumeras in furrows between the plants, cobbing the maize for the pigs. For best results the plants are not fed off until 18 months old. At the present time there are six ½-acre stands, including an acre planted in September last year, and it is intended to have a further half acre next year.

During the drought last year the pampas amply proved its worth on this farm. It is fed off in January and February if desired, and again in June, July, and August. Cattle have to be educated on to it, and are grazed from an hour to 1½ hours per day. They have a limited capacity for pampas at a time, and on this farm hay and swedes are fed in conjunction with it. However, Mr. Adams plans practically to eliminate hay by the increase in his stands.

The only attention required after the first year is to deflower the plants in March, a matter of a few hours' work, and sheep are used to control the weed growth, as they do not eat matured pampas. A further advantage is the shelter afforded the stock by the tall growth.

The following figures summarise production over five seasons:

Season.	Cows.	Fat production. lb.	Acres hay x.	* Acres pampas planted.	Super, tons.	Lime, tons.
1940-41	34	8,700	9†	—	9	8
1941-42	31	7,900	9	⅝ (600 plants)	8	8
1942-43	30	7,900	7½	½ (500 ")	4¾	8
1943-44	32	7,500	6	½ (500 ")	4¾	6
1944-45	33	9,000 x	3	1 (1000 ")	5¾	12 x

† Plus 2 acres ensilage.
* Suitable for grazing 18 months after planting. Total acreage now 2⅝ acres.
x Estimates.

Hedges and Trees

Another feature which is particularly noticeable is the extensive use of shelter hedges and trees. Every steep bank, gully face, odd corner, or old unstumped plantation belt has been utilised either for trees or for pampas, and in addition paddocks of irregular shape have been made into more regular proportions.

"I found the seedless barberry does well here," Mr. Adams said. "It is cheaper, and of course saves double fencing, though the sheep may nibble at the young plants. In those places where gorse and blackberry were likely to persist I have planted *Pinus insignis*. They smother the growth and will be an asset on the farm for timber. The only thing is to avoid places where shade and the pine needles might spoil good pasture. *Lawsonianas* are good, but double fencing makes them a costly shelter. In the last year or two I have made it a practice to grow poplars, which will serve as strainers in due course. These single spreading poplars dotted over the farm provide great summer shade, where it is inadvisable to have pines in open paddock areas. There is no doubt about the value of shade for stock when you see how much use they make of it.

"It is most advisable in the first few years to plant an orchard with a good selection of pears, plums, eating and cooking apples, quinces, and lemons. I would advise anyone to get these planted in the beginning."

Hay and Crops

Finally in the scheme of things is the provision of hay and the cropping —2 to 4 acres of Superlative swedes in the rotation for pasture renewal. As a rule it pays to take only one crop; in the second season clubroot is apt to be severe and the weeds take charge. The best second crop, if this is necessary, is maize, for feeding out in January and February. At the present time 2 acres of swedes are showing up really well, and included in them are carrots and cabbages for home use. Mr. Adams broadcasts 1lb. swedes per acre, and if the strike is a good one, he runs the tine harrows over them for thinning and weed cleaning. "It took courage to adopt this treatment the first time," he said, "but now I do the same to my maize if it is necessary. I sow heavily because you can always thin out a good strike." Probably the limitations of labour are an inducement to adopt that form of weed control.

Between 6 and 7 acres of hay have been cut in the previous two seasons, reduced as the pampas increases. Mr. Adams remarked that he had baled his hay at times, but without proper

CORRECTION

THE article "Internal Parasites of Sheep," by L. K. Whitten, in the May issue of the "Journal," was wrongly attributed to W. G. Whittleston in part of the issue. We apologise for the error, and subscribers who file their copies are advised so that the correction may be noted.

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(3) Wintering well by early feeding of supplementary fodder

(4) Using animal manure on pastures or crops

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shelter it was not a good proposition, especially at 10d. or more per bale. "I had one attempt at making ensilage, but water seeped into the pit and a lot was wasted. In shutting up my paddocks for hay I never work to fixed dates, because circumstances differ each year. Neither do I shut up my spring paddocks on a definite date. The same is true of cropping, but I prefer to get the ploughing done early in August if at all possible, so that the frosts can get to work, and I keep the harrows and discs busy until the swedes are sown about the beginning of December."

It will be obvious that Mr. Adams has been a particularly busy man over the past 15 years. He has found that a one-man farm has its advantages in being independent of indifferent labour, but the limitations can be severe, especially when finance is lacking and there is much development work to be done.

The 50 ewes and 33 cows have proved a good balance on this farm. One year 97 ewes were carried on the 12 acres, but this was too hard on both ewes and farmer. When pampas will have displaced his hay completely, casual labour for harvesting will be completely dispensed with. The position at present is that with the farm well developed and now unencumbered, there is little scope for expansion, and he has years of active life ahead. It must be agreed, however, that more than average ability and determination are necessary to arrive at that position after 15 years, having started out with only £60 and a motor-bike, and breasted a depression.

Acknowledgments

Thanks are expressed to the Soil Survey Division of the Department of Scientific and Industrial Research for the diagram of the soils of the Hamilton Basin and to the Lands and Survey Department for the drawing of the map of the Hamilton Basin.

WINTERING OF PASTURES

IT is an advantage if pastures are allowed to get a little rough before winter, and grazing in the autumn to keep the pastures under control need not be as hard as that in the spring. Rough pastures in the spring and early summer are not favoured, as such growth retards summer and autumn growth and has a smothering effect on the finer grasses and clovers. It is also an invitation to the grass-grub beetle to lay its eggs in the roughage, with a resultant grass-grub attack in the autumn. If, however, summer and autumn growth is allowed to get away a little, the results will be beneficial. Pastures going into the winter with a little roughage on them will result in a better winter growth of grass, and there will be no difficulty in dealing with this roughage during the winter months.

SPIN YOUR OWN WOOL

By J. E. DUNCAN. Wool Supervisor, Livestock Division, Wellington

IS spinning worth while? This all depends on the individual point of view. From a severely practical angle, there is no denying that hand-spinning is a very slow way of preparing knitting wool when compared with the machine process, but it can be considered a pleasant, fascinating, and useful hobby.

THERE is no need to trace the history of spinning, the origin of which is lost in the mists of antiquity, but there can be no doubt that the first attempts at spinning were made by hand. If a well-teased bundle of wool is held in the left hand and a few fibres are grasped by the right hand and pulled away from the bundle while at the same time they are rolled between the thumb and forefinger, it will be found that part of the twist thus imparted passes up into the loose mass of wool, thus entangling further fibres which may now be pulled out with the original ones. If the twisting is still continued as the fibres are drawn out, still further fibres are entangled and the process becomes a continuous one, twisting and drawing, working together and producing a length of yarn. It is obvious that only a short length of yarn can be produced by this means on account of the difficulty of maintaining the twisting process without undoing the twist already inserted in the first part of the yarn.

Until the early part of the sixteenth century the simple spindle was the only mechanical means available for producing a twisted yarn, and in action it was an exceed-

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ingly slow and discontinuous process. The spindle was essentially a round straight wooden rod having attached near its lower end a disc which served to give it added momentum, so that it could be spun like a top, thus imparting a twist to the bundle of fibres which were attached to the tip of the spindle. After sufficient twist had been inserted to convert the "sliver" or bundle of fibres into a yarn, this portion was wound on the shank of the spindle and the process then repeated by drawing a further sliver of the untwisted fibres and applying twist to this in the same way, and so on.

This process, with certain refinements and modifications, was in use for centuries, the main improvement being the application of a drive to the spindle by means of a large wheel and a belt or driving band. The wheel was turned by hand, thus leaving only one hand free to manipulate the yarn. The process still remained a discontinuous one, however, as the spinner had to stop after each length of yarn was spun and wind it on to the shaft of the spindle.

It was not till about 1530 that the treadle spinning wheel, as we know it today, was invented. This was a great improvement in that first, it left both hands free, and second, means were provided to wind the spun yarn on to a bobbin while spinning was taking place, thus making the process a continuous one. Before describing in detail how this was done, it would be advisable to consider more carefully the various steps leading up to the actual spinning.

Selection of Suitable Wool

Although it is possible to spin any of the types of wool grown in New Zealand, the beginner would be well advised to avoid the extremes, i.e., the very long and the very short, the very coarse and the very fine. A suitable wool for a beginner to practise on is a fine crossbred, or a Romney wool, having a count of 48/50's and a staple length of 4-6 inches. In selecting a suitable fleece choose one, if possible, which is reasonably even throughout and open in character (avoid cotted or matted wool), of a good colour, and which contains a reasonable amount of yolk or condition, i.e., natural grease. It is important to make sure that the wool is sound and does not have a bad "break" or weak spot. A single staple or lock when held by the ends should withstand a fairly vigorous pull without breaking.

It is also possible to get very pleasing effects by the use of naturally coloured wool, such as black, brown, or grey, either by itself, or in conjunction with white wool to give a 2-ply marl effect. When a reasonable degree of skill has been acquired in spinning this type of wool, other sorts may be tried, e.g., the finer and shorter halfbred and Corriedale wools, or even Merino, which is the finest wool grown in New Zealand.

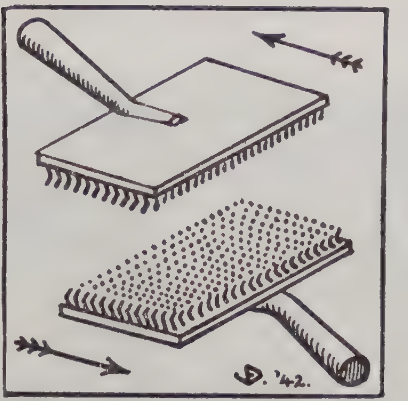

Fig. 1—Hand cards showing bent teeth and direction of movement.

Scoured wool, i.e., wool which has been thoroughly washed to remove the natural grease and dirt, is not suitable for spinning direct, it is too dry and harsh, and before attempting to spin it, it is necesary to apply a fairly liberal amount of oil.

Teasing

This is quite a simple job and means simply the opening out of the individual staples or locks with the fingers into a fluffy mass. It will be found easier and quicker to pull the staples apart sideways rather than endways. Hold the bulk of the wool in the left hand and pull away small pieces at a time with the right hand. At this stage it is easy to remove from the wool any pieces of vegetable matter which may be present, such as thistles, burrs, etc., and also any very short or matted pieces of wool which would be difficult to card. These short bits of wool should not be thrown away, because although unsuitable for spinning, they will be found useful for filling cushions after washing and teasing.

Unless the wool already contains a liberal amount of natural grease, it is advisable to add oil at this stage, as it makes the subsequent processing a good deal easier and more effective. The ideal is olive oil, but as this is at present both scarce and expensive a good substitute is a mixture of neatsfoot oil and kerosene, approximately equal parts. Mineral oils such as used for lubricating motor-cars and machinery must be avoided, as they will not wash out during the later stages. The oil is put in a saucer and the fingers are constantly dipped in it as teasing proceeds. It is wise to leave the teased wool lying for a day or so before carding it, as this gives the oil time to become evenly distributed throughout the wool.

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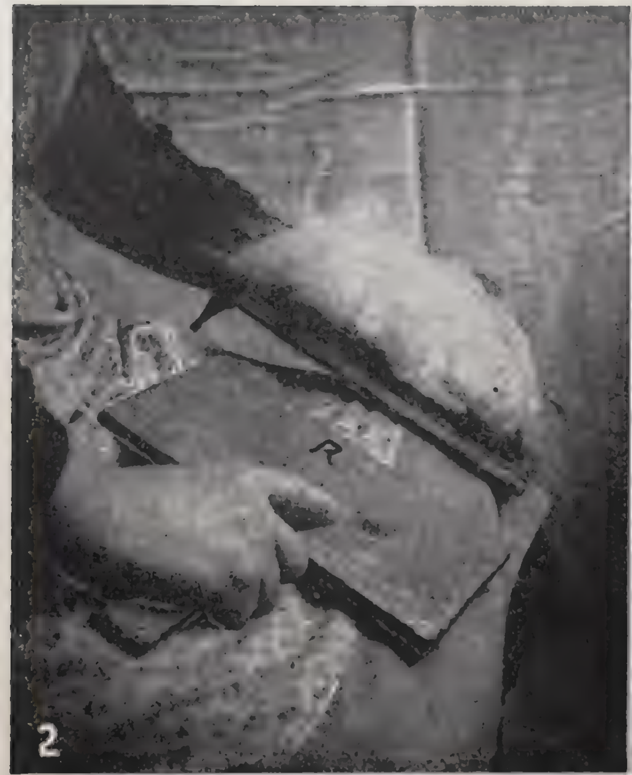

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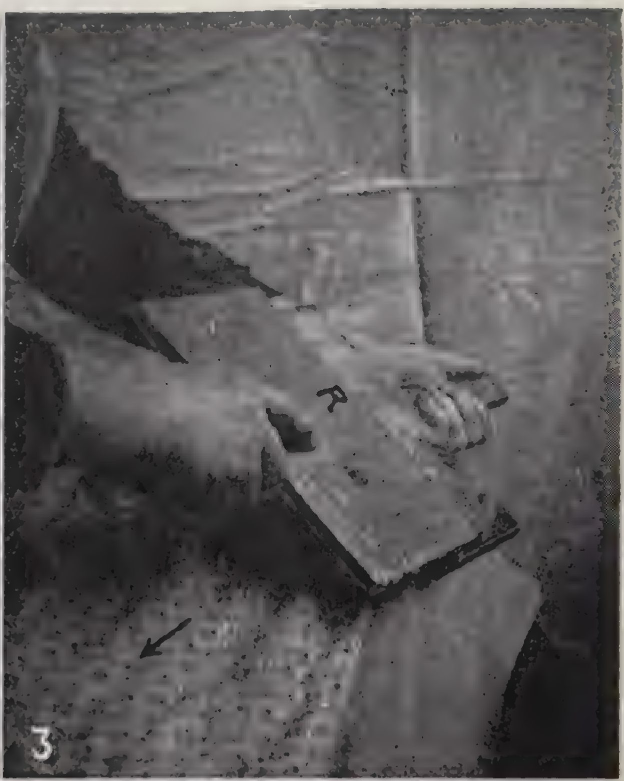

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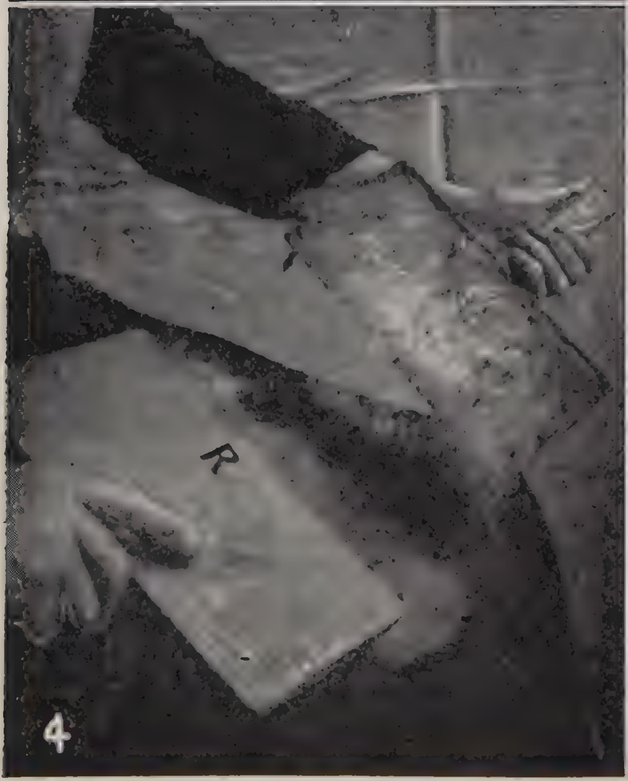

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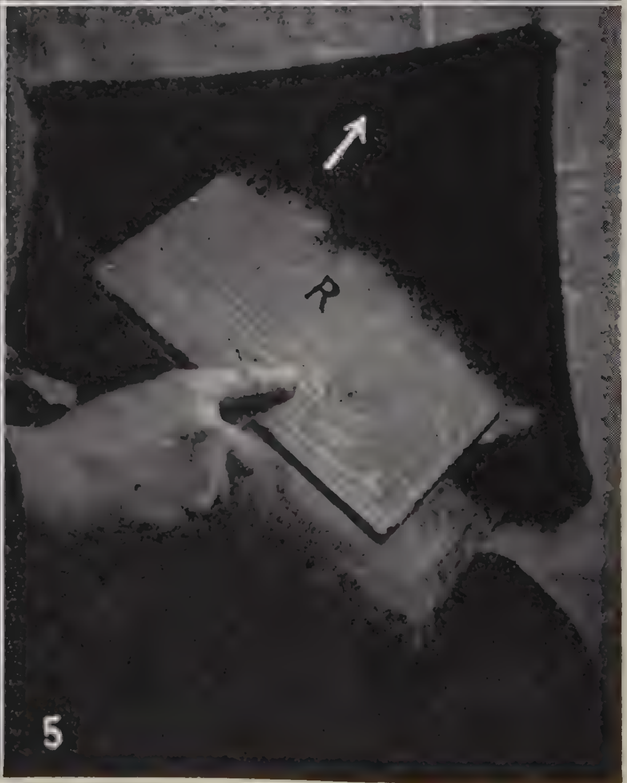

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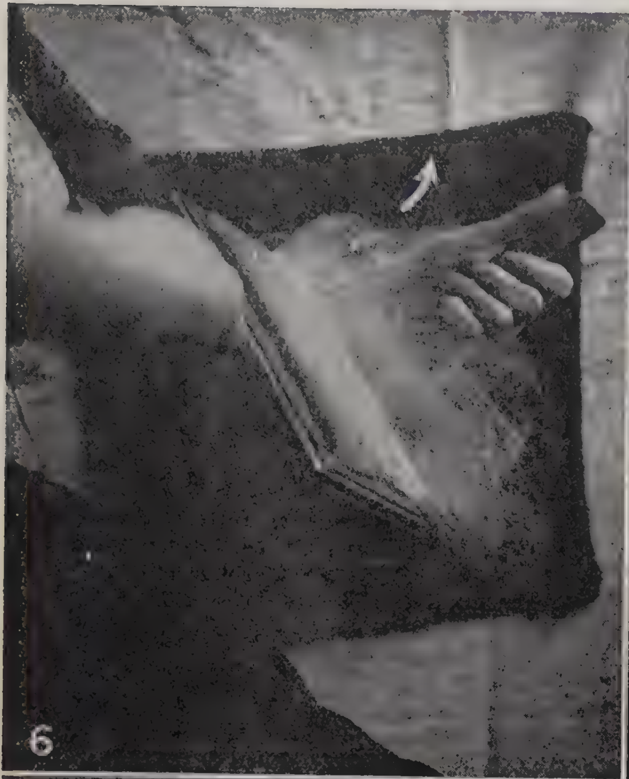
STAGES IN CARDING



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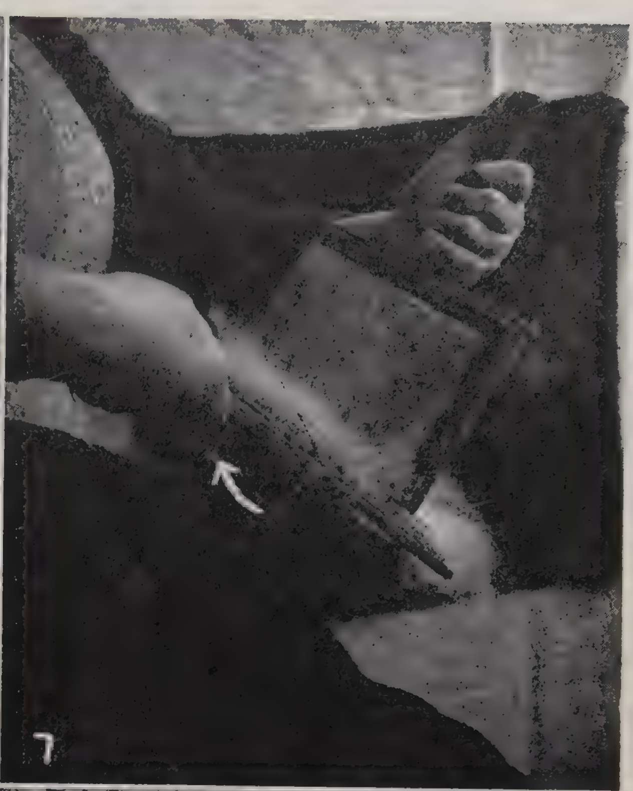

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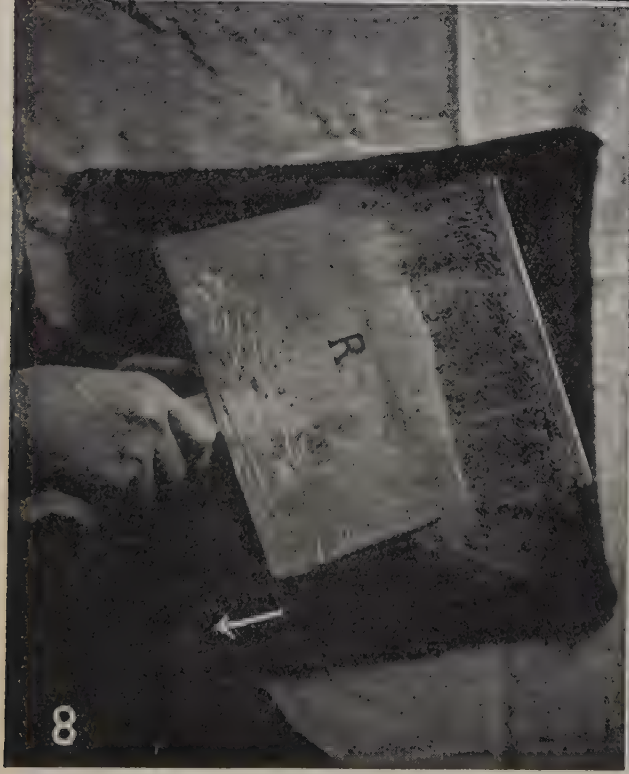

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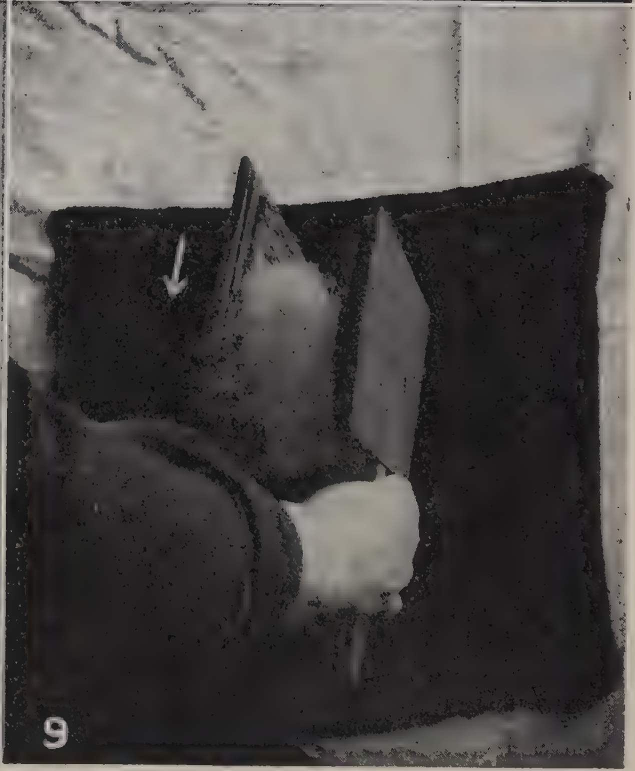

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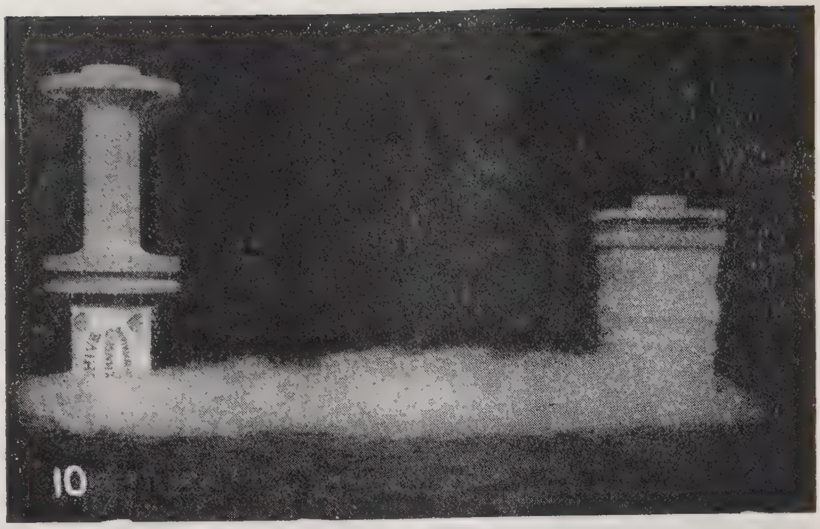

The finished "Rolag" showing empty and full bobbins.

Carding

The object of carding is thoroughly to mix and open the mass of wool fibres so that they can be easily spun to give a regular yarn. It is accomplished by means of the hand cards shown in Fig. 1, which are provided with a large number of fine hooked wire teeth, set in a leather or canvas base which is in turn attached to the wood. Carding is much easier to demonstrate than to describe, but it is hoped that the series of photographs, Figs. 2-9, will make the process reasonably clear.

Fig. 2 shows the commencement with the left hand card loaded evenly, the wool having been placed and distributed on its surface with the fingers. The most common mistake among beginners is to attempt to card too much wool at a time, and good results will never be obtained when the cards are overloaded. Rather err on the side of too little to begin with. The photograph also makes clear the correct method of holding the cards, which should be marked right and left respectively, and always used in those hands for best results. It will be easier at first if the back of the left card is rested on the left knee to steady and support it.

In the first position the points of the hooks on the wire teeth are facing each other, so that when the right hand card is drawn longitudinally across the left (as shown in Fig. 3), the teeth do two things—they have a combing action on the wool on the left card, and they draw some of it away as it becomes entangled on the teeth of the right card. This process is repeated several times until the bulk of the wool has been transferred to the right card (care being taken to pull it well clear of the left card each time), which leaves a straight fringe of fibres protruding from each card.

This stage is illustrated in Fig. 4. When returning the cards at the commencement of the next stroke (Fig. 5), care must also be taken that the

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fringe is not doubled over, leading to tangling. This can be avoided by keeping the right card well up till it is in position to be lowered for the next stroke.

The next step is to transfer the partially carded wool back to the left card for further treatment, and this is accomplished as follows: The inner edge (next the handle) of the left card is held against the outer edge of the right card, and by an upward movement of the left card the wool is stripped off the backs of the teeth on the right card and transferred to the left card. Fig. 6 should make this plain.

Carding is now repeated several times more until the wool is "clear," i.e., free from all tangles and evenly opened out. In between each carding it is transferred back to the left card as described above.

It will frequently be found that a good deal of wool is being left behind on the left card and it is desirable that this should be completely transferred to the right, which is done in exactly the opposite way to that described above, viz., the inner edge of the right card is applied to the outer edge of the left card, and by an upward motion of the right card the wool is stripped off the left and transferred to the right card. (See Fig. 7).

When the wool has been sufficiently carded it has to be stripped off **both cards.** This is done as shown in Figs. 8 and 9. Hold both cards upright and apply the outer edge of the right card to the outer edge of the left. A downward pull of the right card will now strip most of the wool off the left. (Fig. 8). Now reverse the process by pulling the left card downwards to strip the wool off the right. (Fig. 9). The wool should now be sufficiently loose to be shaken free of the cards—but if not, a repetition of the above process and a little judicious "wangling" will free it.

Remember that thorough carding is more than half the battle in good spinning.

Making the "Rolag"

After the soft loose mass of fibres has been shaken free from the two cards, the orthodox procedure is to let it fall on the back of the left card and then roll it with the back of the right card until it assumes the form of a loose cigar-shaped roll 7-10 inches long and 1-1½ inches in diameter. A typical "rolag" is shown in Fig. 10. Some cards are not flat on the back, owing to the projecting manner in which the handles are fitted, and do not lend themselves to the making of rolags. In this case, and probably for all beginners, it is easier to make the rolag by rolling the wool on a table or on the floor with the hands.

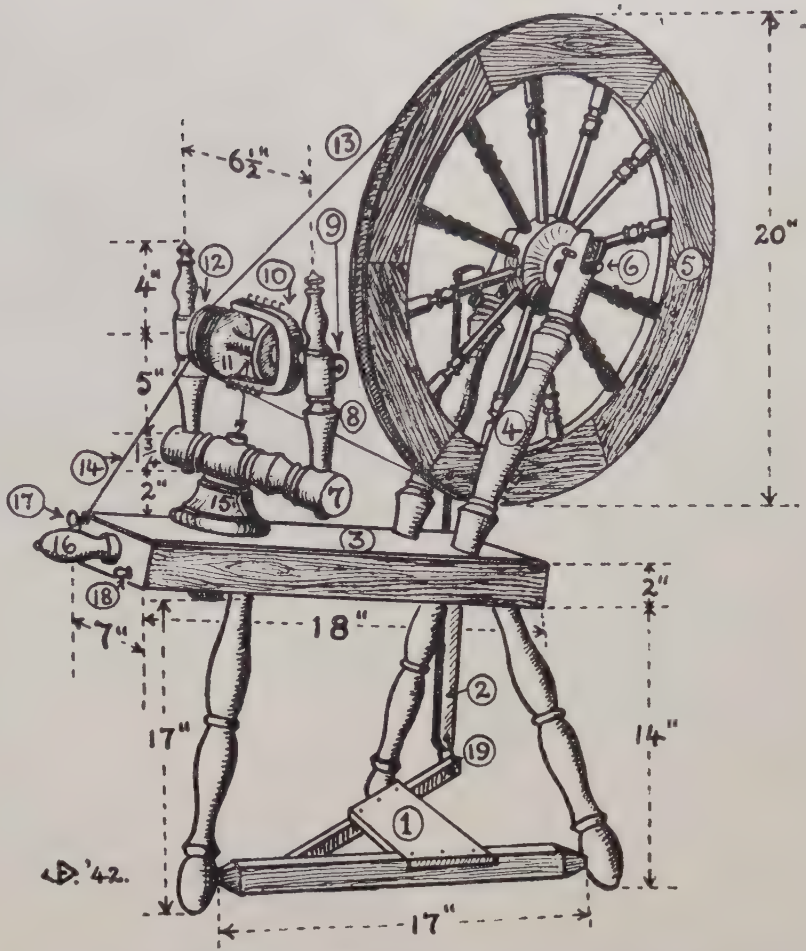

Fig. 11—A typical spinning wheel. Names of parts and principal dimensions. (Dimensions of bobbin, flyer, etc., are not given here because they are identical with those given in the diagram in Fig. 13). 1. Treadle. 2. Pitman rod. 3. Base-board. 4. Wheel-support. 5. Wheel. 6. Metal axle. 7. Hortizontal bar. 8. Spindle support. 9. Leather bearing for spindle. 10. Flyer, showing hooks. 11. Bobbin. 12. Pulley driving spindle and flyer. 13. Driving belt or band. 14. Bobbin brake-band. 15. Spindle base. 16. Tension screw—for pulling spindle assembly away from wheel, to take up slack in driving belt. 17. Tensioning peg for bobbin brake-band. 18. Threader, made from hairpin fitted with handle.

The test of a good rolag is to hold it up to the light; it should present a uniform open appearance throughout with no dense parts or patches of short, tangled, or knotted fibres. These all lead to difficulties in spinning and imperfections in the yarn, and if numerous, indicate that further carding is required. If there are only a few, they can easily be picked out and removed with the fingers.

Spinning Direct from Fleece

With a suitable fleece having an open staple or lock formation it is quite practicable to spin direct from the fleece without the intermediate stage of carding—but it is difficult to get the same uniformity in the yarn, and the whole process requires keener concentration and attention on the part of the spinner. Beginners would be well advised not to attempt spinning in this way until they have first mastered the more orthodox method.

Choice of Spinning Wheel

There are now available quite a number of different styles of spinning wheels, and several attachments designed to be run from sewing machines, either treadle or electric. As is usual with anything which quickly becomes popular, a good many of the machines being offered to the public are of rather shoddy construction, but at the other end of the scale are wheels which not only perform well but are so well finished that they have an additional artistic value as graceful pieces of furniture and will not look out of place in any sitting-room. The range in price is also considerable, from ten shillings for the simplest sewing-machine attachment to six or seven pounds for some of the wheels.

In choosing a wheel the following are a few of the points to look for if there is an opportunity to examine it. For reference to the names of parts see Fig. 11.

1. The wheel should be reasonably true and well balanced, not warped or buckled.
2. It should revolve smoothly and evenly, requiring very little effort to treadle.
3. There should be some effective means of adjustment for the driving belt to take up any slack which may develop.
4. The flyer and bobbin should be capable of revolving rapidly and smoothly without undue vibration and noise.
5. The best design is that where the spindle revolves in thick leather bearings, as these are silent, oil-absorbent, and long wearing. Furthermore, the flyer and bobbin should be **between** these bearings; those designs which have them overhanging one bearing are very prone to vibration and noisy running.

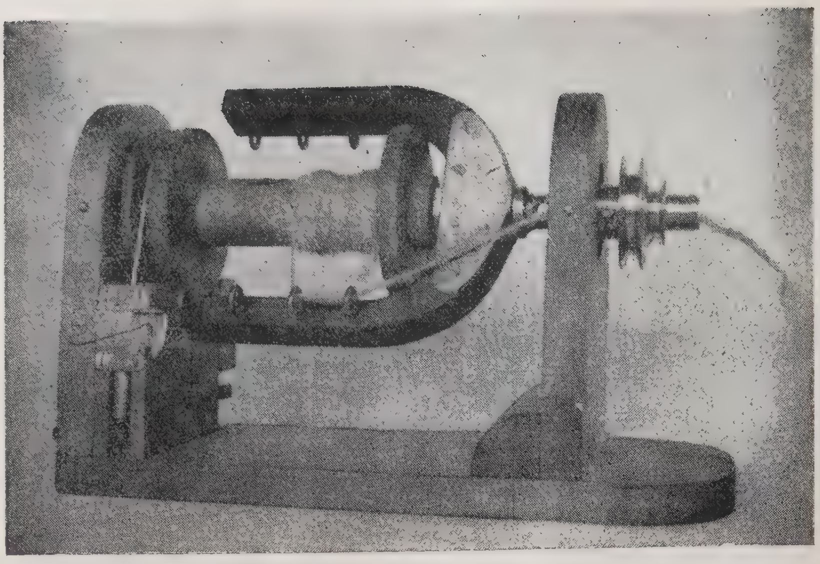

Fig. 12—Sewing machine attachment built by author. Detailed dimensions are given in Fig. 13. Note how end support swings out on hinge when hook is lifted, making bobbin easy to remove. The leather bearings are pivoted on steel pins to facilitate this. N.B.—The bobbin brake-band terminates in a light coil spring, which gives smoother running and compensates for any inequalities in bobbin.

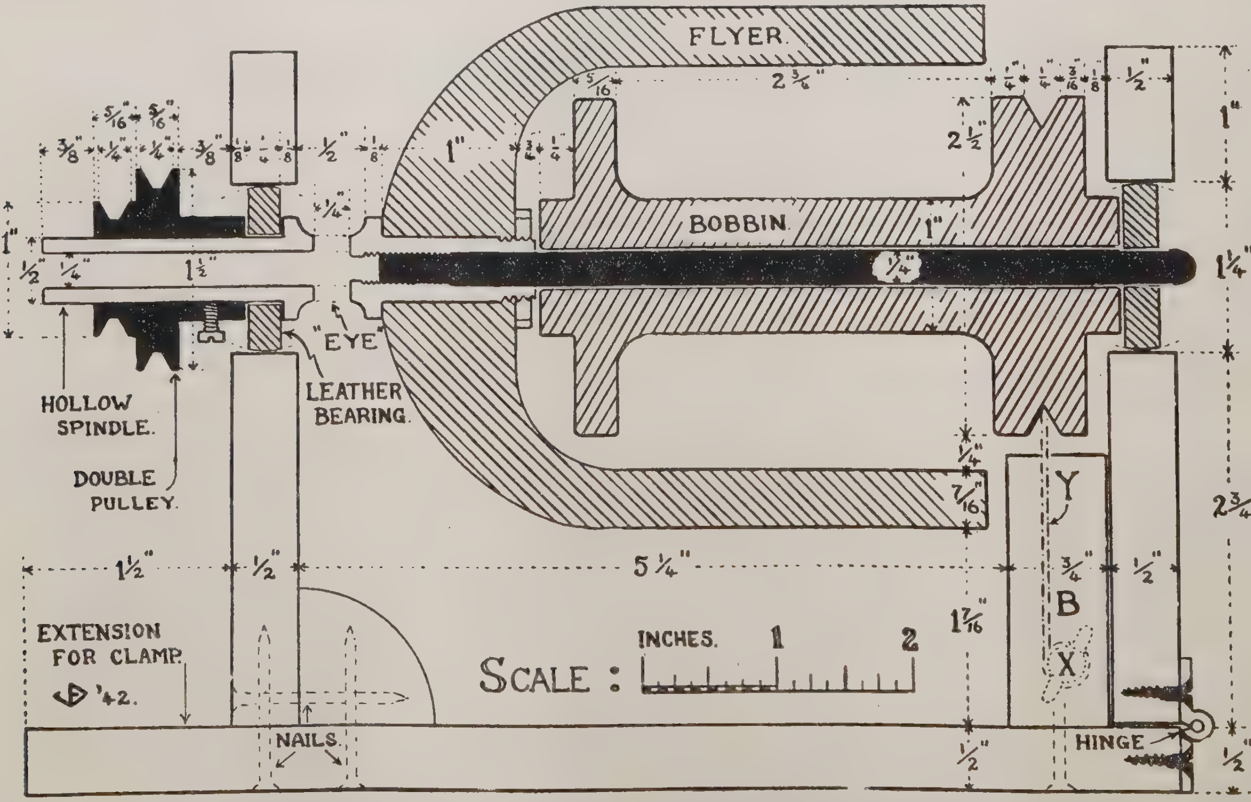
FLYER
BOBBIN
HOLLOW SPINDLE.
DOUBLE PULLEY.
"EYE"
LEATHER BEARING.
EXTENSION FOR CLAMP.
NAILS.
HINGE
SCALE : INCHES. 1 2
Y
B
X
5/16" 5/16"
3/8" 1/4" 1/4" 3/8" 1/8 1/4 1/8 1/2" 1/8
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Fig. 13—Longitudinal cross section of sewing machine attachment. B is a fixed block to which the hinged end support is fixed by a hook (see Fig. 12). Y is bobbin brake-band, and X is the tensioning peg for same. Width of base-board is 4½ inches.

6. In all machines there is included some feature to give the bobbin and the flyer different speeds of rotation. In the older machines this was achieved by two driving bands, one for the bobbin and one for the flyer, which were fitted with different-sized pulleys. This system gives no scope for adjustment and is inferior to the type where the flyer only is driven and pulls the bobbin round with it, but at a slightly lower speed on account of an adjustable brake-band which retards the bobbin. This brake-band usually consists simply of a string tensioned by means of a peg which is twisted, but make sure that whatever system is used it works properly, for on this adjustment successful spinning largely depends.

7. The bobbins, of which there should be at least four, should all be the same size, and should run truly.

The last four points also apply to the choice of an attachment for a sewing machine, which works on exactly the same principles as the spinning-wheel, differing merely in its manner of drive.

Fig. 11 is an illustration of a typical spinning-wheel, and Fig. 12 shows an attachment made by the author, for use with an electric sewing machine, and this has given good results. For those interested in building their own wheel attachment, the plans given in Figs. 11 and 13 should be of help. For others not concerned over-much with the appearance of the finished article and who may not have the facilities or the time to make a wooden wheel, a bicycle wheel (preferably one of the smaller sizes) will be found to be a useful substitute.

Drafting

Before describing the actual procedure in spinning, it is advisable to explain at this stage the mechanism of drafting, on which successful spinning largely depends. In Fig. 14a is illustrated a short length of yarn in which there is a noticeably thick place or "slub." It will be noticed that the thinner parts of the yarn are fairly closely twisted, whereas the thick part has very little twist. The close twist of the thinner portions renders them relatively stronger than the loosely-twisted thick portion, so that where this length of yarn is subjected to tension it stretches, mainly at the thick region, by one fibre slipping over another. As the thick portion is reduced in diameter some of the twist from the adjacent portions passes into it and tends to tighten it up, thus reducing the amount of twist, and to some extent the strength, of the thinner portions. (See Fig. 14b). If this process went too far the yarn would be likely to break if tension were still applied, but in practice the twist in the thinner portions is being replaced by the rotating spindle of the spinning machine, so that further tension can safely be applied to cause further slipping, reduction of diameter, and twisting of the thick portion, until finally it closely resembles the rest of the yarn in both thickness and degree of twist. (See Fig. 14c). The yarn will now be sufficiently tightly twisted to prevent further fibre slippage, so that the only result of applying greater tension will be to cause it to snap.

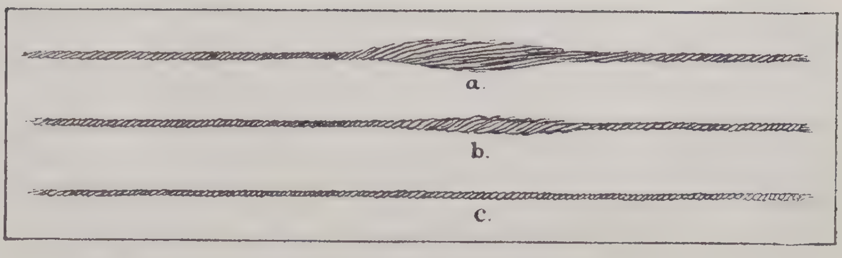

Fig. 14—Drafting, to reduce thick place in yarn.

This principle of drawing out the yarn to even it up and get rid of thick places is known as "drafting," and it is indeed fortunate that this characteristic reaction invariably takes place, for without it the difficulty of producing anything like an even yarn by hand would be very great.

Spinning

To start spinning for the first time, proceed as follows:—

1. Place an empty bobbin on the spindle and tie tightly to this bobbin the end of an eighteen-inch length of wool or string.

2. Then take this string up over the nearest hook on the flyer and thread it out through the hollow end of the spindle. This is most easily accomplished by pushing up inside the hole in the spindle a hairpin, or similar bent bit of wire, until it can be seen from the "eye" or hole in the side. It is then easy to push the string through both "eye" and hairpin, and draw it out by means of the latter. Another useful thing for the same purpose is a short length of spring curtain rod. If the last three or four turns are stretched out, they form a miniature "corkscrew," which easily catches in the string or woollen yarn and pulls it out through the spindle.

3. Now see that the brake-band is properly in position in the groove in the bobbin and that there is some tension on it.

4. Hold the rolag near one end in the right hand and lay the end of the piece of string, or wool, along it for an inch or two. Now start to treadle, slowly at first.

5. It will be found that the end of the string will start to revolve too, and if it has been laid correctly it will immediately entangle and pick up some of the loose fibres of wool in the end of the rolag. If correct tension has been applied to the brake-band, there will also be a tendency

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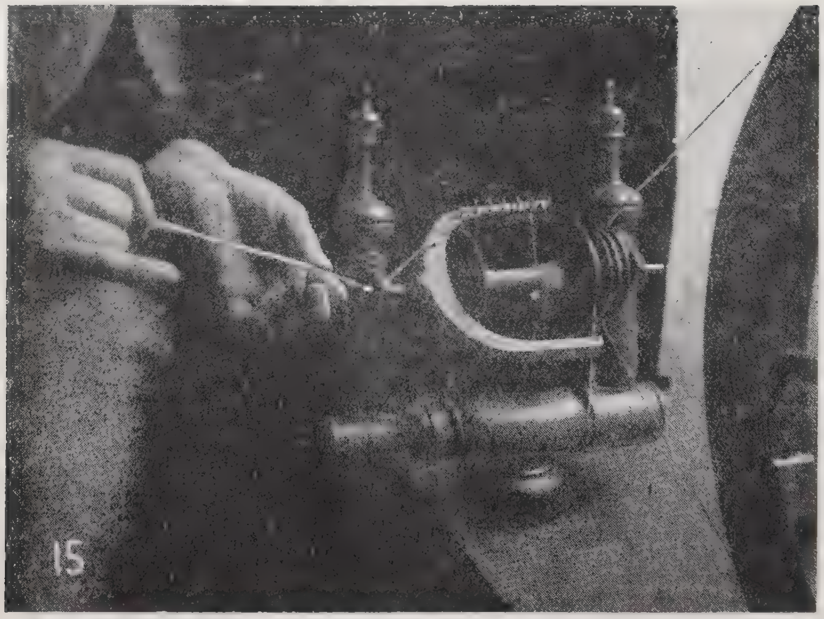

Fig. 15—Drafting yarn by drawing back the right hand holding the rolag.

for the string to be drawn in through the hollow spindle.

6. This is the time to speed up the rate of treadling, and at the same time assist the string in its movement towards the spindle by pulling it in that direction with the finger and thumb of the left hand against the tension of the wool, to which it is now attached. At the same time that this is happening the finger and thumb of the right hand should be grasping the rolag an inch or so from the end and drawing it away in the opposite direction. The combined operation will have the effect of drawing out from the end of the rolag the small wisp of fibres which has become entangled in the end of the string.

7. The left thumb and forefinger are now momentarily released from the string and the right hand is brought towards the spindle. Two things should now happen simultaneously; the string should be drawn through the spindle and wound on to the bobbin, and the twist should run up the wisp of wool fibres towards the rolag. If all has gone well up to this stage, continuous spinning should follow on without difficulty.

8. The spun yarn is again grasped between finger and thumb of left hand at a comfortable distance from the spindle (usually 6-12 inches). This distance will vary according to the length of the spinner's arm, where he is sitting, and other factors, but the main thing is that the spinner should assume a comfortable attitude, as any other will soon be tiring. While the yarn is thus momentarily held the right hand should be drawn steadily backwards for two or three inches, allowing a further loose wisp of fibres to be drawn out from the rolag. To begin with, the length that can be drawn out at a time will be small, but as skill and confidence increase, so also will the length which can be safely drawn out each time. Fig. 15 shows this stage.

9. If the wisp of fibres is drawn out too far, it will simply part company with the rolag, but before this stage is reached the left finger and thumb are momentarily released, thus allowing the twist to run up and strengthen the wisp or "sliver" of fibres. As this happens the right hand is again moved towards the spindle, thus allowing the spun yarn to be drawn in and wound on the bobbin. (See Fig. 16).

10. As the right hand reaches the end of its stroke the left once more grasps the yarn and the right is again moved away, thus pulling out a fresh wisp or sliver of fibres. The left is again released, allowing the twist to run up, and so the process is repeated each time.

11. It is very important to see that the twist does not run up past the right forefinger and thumb into the rolag itself, or the spinner will find himself in difficulties immediately. Actually there should always be a short length of fibres, about an inch, practically free of twist, immediately in front of the right finger and thumb. It is from this length of untwisted fibres that the sliver is drawn out. Were these fibres already tightly twisted, it would be difficult or impossible to draw them out at all. It is the main function of the left hand to control the rate at which the twist runs up the sliver, letting the twist pass the finger and thumb enough to make the yarn hold together, but not so much as to prevent drafting or drawing out of the sliver. As spinning progresses the rolag is progressively fed forward through the hand to keep up the supply of untwisted fibres. When the bobbin begins to fill up in one place the yarn is moved along on to the next hook on the flyer, so that the bobbin is filled up by stages.

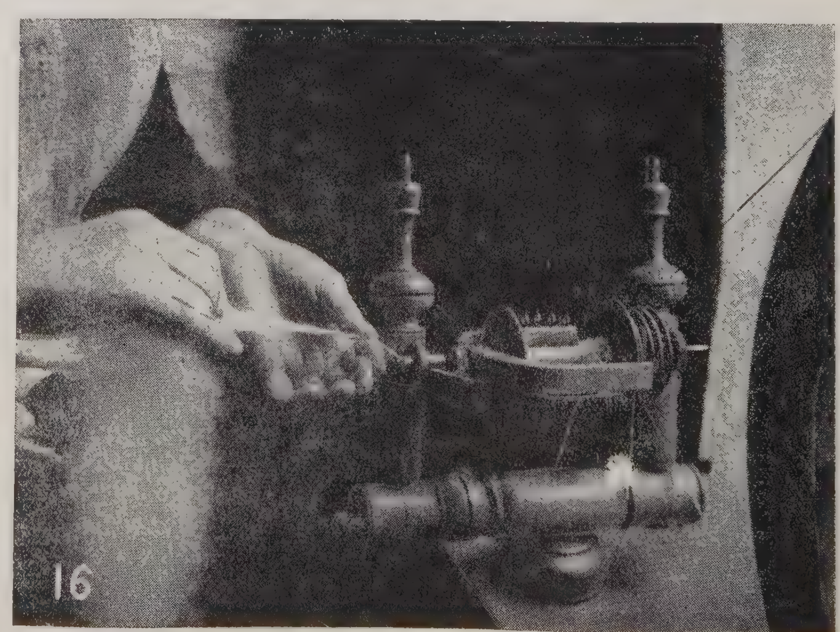

Fig. 16—Feeding the spun yarn forward through the spindle.

12. The importance of having the correct amount of tension on the bobbin brake-band can now better be explained. If no brake-band were provided, the bobbin and flyer would rotate together, at the same speed, the flyer pulling the bobbin round with it per medium of the yarn. The yarn would become twisted by the rotation, **but would not feed on to the bobbin.** The whole function of the brake-band is to retard the speed of the bobbin slightly below that of the flyer, with the result that when the latter makes say 30 turns the bobbin makes only 29. One complete turn of yarn is thus wound on to the bobbin for each 30 turns of the flyer. If the tension is too great, the bobbin will be unduly retarded and the effect will be that the yarn is drawn in too forcibly before it has had time to receive sufficient twist, thus giving a weak and soft-twisted yarn. What usually happens in practice is that the yarn is pulled away from the spinner's grasp and snaps before he can control it.

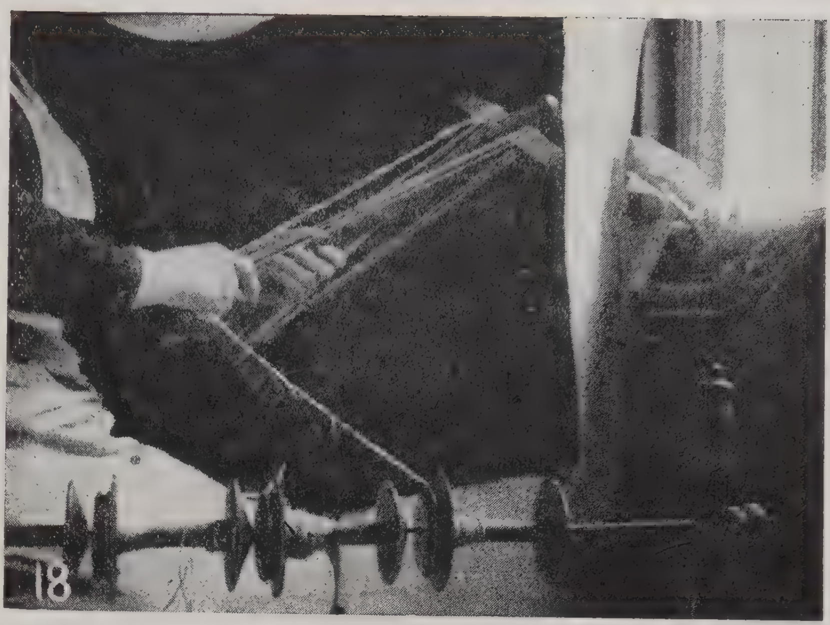

Fig. 18—Winding from bobbin on to skeiner.

Conversely, too little tension on the brake-band will mean that the yarn is hardly drawn in at all and is badly over-twisted. This will cause it to be very hard and full of kinks. Only practice will indicate just the correct amount of tension.

Most bobbins become warped after a while, which means that the groove for the brake-band is no longer a true circle, the band being a bit tighter at one part of a revolution than another. This trouble can be largely overcome by incorporating a piece of elastic or a very light spring between the end of the brake-band and the tensioning peg. This acts as a sort of "shock absorber" and smooths out the irregularities.

Breaks in the yarn are easily mended by fraying out the broken end of the yarn and also the end of the rolag, and overlapping these portions an inch or two. The twist will run up into this portion and firmly join it. An expert can repair a break in an instant without even slackening the speed of treadling, and so neatly that the join will be undetectable.

At best, spinning is a difficult process to describe on paper, a practical demonstration from someone already versed in the art being far the best way to learn. The foregoing notes are given only in the hope that they will be of assistance to those not fortunate enough to receive direct tuition.

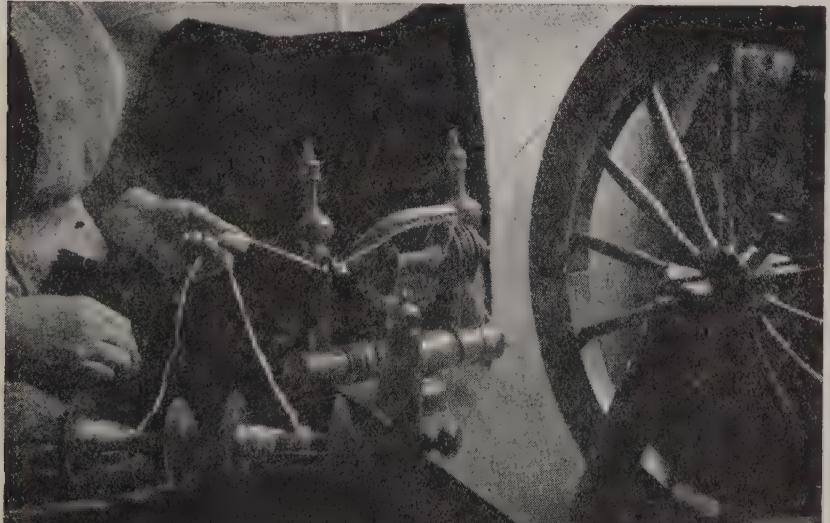

Fig. 17—Two-plying.

Plying Wool

The thickness of the yarn spun can be varied a good deal according to the wishes of the spinner, but even if thick enough, the single-ply yarn which is spun is not suitable for knitting. To make it so it is necessary to twist two or more strands together. This is easily done, as follows:—

For example, to make two-ply wool two full bobbins of single-ply yarn are placed on the bobbin holder or "Lazy-Kate," as it is called. The ends of these yarns are tied to the "leader" (the short length of wool usually left on a bobbin to facilitate starting), so that they are twisted together and wound on to the bobbin as a two-ply yarn. (See Fig. 17). Two points in the procedure differ, however, from ordinary spinning. First, the tension on the brake-band is considerably increased, so that the two-ply yarn will wind on to the bobbin without assistance, the two strands merely passing between the fingers as a guide. Second, the direction of rotation must be reversed. This is done simply by treadling the wheel in the opposite direction, but in the case where an electric sewing machine is used and the motor cannot be reversed, the same effect can be obtained by crossing the belt. By plying white and a coloured strand pleasing marl effects can be obtained.

Skeining

The next stage is to place the full bobbin of two-ply wool on the Lazy-Kate and wind it off on to the skeiner. (See Fig. 18). It will be noticed that it is wound on to the skeiner with an over-and-under motion, so that while the skeiner itself is 18 inches long the skein when removed measures 36 inches, when stretched over the fingers. Before it is removed from the skeiner, however, the skein of wool should be tied in four places with string to prevent it tangling when being washed.

Washing

Thorough washing is necessary to remove the natural grease, and any oil which may have been added. The skeins should be washed in water at about 120 deg. F. (as hot as the hand can bear), to which has been added good laundry soap. Do not rub or agitate unduly, but rather squeeze gently in the hands to avoid tangling and felting. If the wool is very dirty, it may need a second wash with more soap before it is rinsed in plenty of warm water, and then hung in the sun and wind to dry.

Bleaching

At this stage the wool may be quite white enough and ready for use, but some varieties of wool may show a creamy or yellowish tinge which is not desired, and must be bleached. This can be done either with the wool in the skein or after it has been knitted up. The procedure is simple. Have the wool damp (after washing) and hang the skein or garment inside a fairly large packing-case, which is turned open side down, so that the wool is hanging from the bottom. Place some glowing wood embers in an old tin and put this on the ground inside the case, sprinkling over the embers about a heaped teaspoonful of sulphur. Lower the case on to the ground again, leaving just a small opening at the bottom, enough to admit a little air, and make sure the sulphur is all burnt. Leave the wool exposed to the sulphur fumes for half a day, and by that time it should be thoroughly bleached. This process may be repeated at any later date if the article shows signs of yellowing again. Some wools, such as Merino, are naturally white and will never require this treatment.

Spinning for the Navy and Merchant Marine.

The Navy League has done much good work in encouraging the spinning and knitting of garments for men of the Navy and Merchant Marine, such as sea-boot stockings, heavy jerseys, and balaclavas. There is not now the same demand for stockings and balaclavas, as these items are issued to the men, but heavy, warm, long-sleeved jerseys with high collars are still very popular and keenly sought after. Mr. W. J. Jordan, the New Zealand High Commissioner in London, has appealed for as many of these jerseys as possible, and there is no doubt that the homespun hand-knitted article combines qualities of warmth, comfort, and durability difficult to excel.

The instructions for knitting this type of jersey as given by the Navy League are quoted below.

Plain Long-sleeved Pullover.

One pair No. 7 needles, 1 set No. 8 needles, pointed at both ends.

1¼lb. to 2¼lb. of wool, according to thickness of yarn.

Front.—Cast on 88 stitches and work in rib of 2 plain, 2 purl for 20 rows. Then continue in stocking stitch until work measures 28 inches. Cast off 26 stitches at each end and leave the remaining 36 stitches to be picked up later for the neck on the No. 8 needles.

Back.—Work another piece exactly the same.

Sleeves.—Cast on 52 stitches on a No. 8 needle and work in rib of 2 plain, 2 purl for 20 rows. Change to No. 7 needles and work in stocking stitch, increasing at both ends of the 7th row, and then at both ends of every 6th row until there are 84 stitches on the needle. Continue without decreasing until the sleeve measures 21 inches. **Cast off very loosely.**

Sew up shoulders.

Sew up side seams for 18 inches. leaving 10 inches for armholes; sew up sleeves and insert in armholes.

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Collar.—Pick up neck stitches on the No. 8 needles and work in rib of 2 plain, 2 purl for 5 inches. **Cast off very loosely.**

For any further particulars apply direct to:—The Navy League, Spinning Room, M.L.C. Bldg., Featherston St., Wellington, C.1.

DYEING

The easiest way to accomplish this is to take the knitted garment to one of the commercial dyeing and cleaning firms to have it dyed; and most of the packet dyes on sale are also fairly reliable and easy to use, but quite apart from the cost involved in this procedure it is likely that anyone sufficiently interested to do their own spinning would also like to try dyeing with one of the vegetable dyes, which are procurable from many homely sources and have a fascination all their own.

Dyeing may be done at practically any stage. For instance, the loose wool may be dyed before spinning, the yarn may be dyed in the skein, or the finished garment itself may be dyed. Each method has points both for and against it.

Dyeing the loose wool means a good deal of extra work, as the wool has first to be thoroughly washed or scoured before dyeing, and then well oiled again afterwards before it can be spun, but for certain things such as the making of a "heather-mixture" yarn this extra work is inevitable, as the speckled effect in the yarn is obtained by thoroughly carding together two or more colours of wool before spinning. Dyeing the loose wool will also give the most even shades where only one colour is used, for any irregularities of shade will be levelled out in the carding process, which thoroughly mixes and blends the wool.

Commercial dyers are generally reluctant to dye wool in the skein because it is more difficult to get the colour absolutely even, and any irregularities in shade are apt to be rather conspicuous when the wool is knitted up. However, for home-dyeing with vegetable dyes and where reasonable care is taken, this method is generally quite satisfactory and has the advantage that enough wool for quite a lot of knitting can be dyed at once.

The third method of dyeing the actual garment has the advantage that irregularities in shade are not so obvious, as they vary gradually from one part of the garment to another and not abruptly as where the irregularity lies in the yarn itself.

Vegetable Dyes

As a class, vegetable dyes produce shades which are reasonably fast to light, but their main attraction lies in the range of soft, mellow tonings which may be produced by their use, and which cannot easily be duplicated by the use of the coal-tar dye-stuffs, which tend to give brighter but "harder" colours. Furthermore, if vegetable-dyed materials do fade, the new tones are nearly always still pleasing to the eye, which is more than can be said for some of the aniline dyes. Another advantage is the ready availability of many of the materials and the endless different shades which may be produced by varying the conditions under which they are used.

It is desirable for this reason to make notes when dyeing about the source of the material, the time of year when it was gathered, and the exact conditions under which it was used, so that this information will be available later on if it is desired to reproduce the same shade again.

Mordants

With few exceptions most of the vegetable dyes will not colour wool directly by themselves, but require a third substance, or "mordant," to act as a link binding the dye to the wool fibre. Fortunately, most of these mordants are well-known chemical substances which are generally readily procurable. The ones commonly used in vegetable-dyeing of wool are:—

1. **Alum** (Potassium aluminium sulphate):—This is the most widely-used mordant for wool. Use in the proportion of 3 to 4 ounces of alum to 1lb. of dry clean scoured wool —the smaller quantity for fine wool or light shades, the larger for coarser wool and/or darker shades. The alum is dissolved in sufficient water to hold the wool comfortably. Too much water means waste of time and fuel in heating—too little means the wool is too tightly packed and uneven dyeing results. This applies to all mordants.

When the alum is dissolved and the solution is warm, put in the damp wool (i.e., it will still be damp after washing out the oil), and bring **gradually** to the boil and simmer gently, keeping it just boiling for 30 minutes. Allow solution and wool to cool, and then gently wring out the wool and place it in linen or cotton bags (old salt or flour bags) in a dark place for 2-3 days before dyeing. This allows the alum thoroughly to impregnate the fibre and is the best method. If this cannot be done and dyeing has to follow immediately, the wool will have to be boiled for 45 minutes with the alum—but the first method gives the best results. Too much alum makes the wool sticky.

2. **Bichromate of Potash:**—This is another very useful mordant, used in the proportion of a quarter of an ounce to 1lb. of wool. Use in the same way as for alum, but boil for 45 minutes. Dyeing may follow immediately. Keep lid on pot to exclude light, which affects this mordant.

3. **Iron Sulphate** (Copperas: Green Vitriol):—Use a quarter of an ounce to 1lb. of wool and boil for thirty minutes. Don't prolong the boiling or exceed the above quantity, or the handle of the wool will be impaired, and the colours unduly darkened.

4. **Tin Crystals** (Stannous Chloride): Use a quarter of an ounce to 1lb. of wool. Enter the damp wool into the **cold** solution and boil for one hour. Nearly always used in conjunction with cream of tartar, but may be used as a modifying agent with other mordants to brighten

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colours. Too much makes wool harsh and brittle.

5. **Cream of Tartar** (Argol):—This is not strictly a mordant as it is not used by itself but as a modifying agent with other mordants—generally to brighten colours. It must be used carefully and a record kept of the exact proportions used if the shade has to be duplicated later. Usually about one ounce to 1lb. of wool is used.

General Hints on Mordanting

(a) Have wool perfectly clean and free from all grease or soap.

(b) See that all the mordant is dissolved before entering wool.

(c) Make sure that skeins are properly tied, but not too tightly or dye won't penetrate at those points, resulting in light patches.

(d) Enter the wool damp to get even penetration and results.

(e) Stir only enough to get even penetration—too much agitation will lead to felting of the wool.

(f) Have pot large enough to hold wool comfortably and keep lid on to exclude light.

(g) Although mordanting is generally done before dyeing, the two processes may be done together in the same pot, which generally gives brighter colours which are not so fast to light. Where great fastness is required the wool may be mordanted, dyed, and mordanted a second time, although this is inclined to make it rather harsh.

A single dye may give totally different colours when used with different mordants, e.g., cochineal with iron sulphate gives a purple shade. When cream of tartar is added to the iron sulphate the colour becomes grey, and the further addition of tin crystals changes it to red. It is worth while experimenting with the various mordants, and a small quantity of wool in testing any new dye for the first time.

Equipment

This is very simple, consisting of enamel or galvanised iron vessels fitted with lids, wooden (or better still glass) rods for stirring, and a few muslin or cotton bags to hold some of the vegetable materials and keep them from being entangled in the wool. Rubber gloves are useful.

Method of Dyeing

The dye may be extracted from material such as roots or bark by first pulverising and then boiling in water for an hour or more, the strained liquor being used to dye the wool. In this case the wool is put into the boiling liquor. Alternatively, materials such as lichens can be placed in bags among the wool in alternate layers, and the whole lot boiled together until the required depth of shade is reached, generally for an hour or more. It may be mentioned here that the lichens are among the few vegetable materials which require no mordant, dyeing direct on to the wool. Usually the wool is allowed to cool in the dye liquor to allow it to reach the fullest depth of colour. Always

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use soft water for dyeing. Rain water is best of all.

As with mordanting, the wool must enter the dye damp. Keep it well covered with liquor and stir it gently from time to time, but not enough to cause felting. The wool is lifted and stirred by means of the wooden sticks, but care must be taken that dye which has soaked into these does not come out again and spoil some light wool with dark stains. That is why glass rods, such as those sold for towel rails, are so much better. They do not absorb the dye. Prolonged boiling will spoil some shades, e.g., reds and yellows.

After dyeing rinse well in running water and dry. Of course when dry the final shade will be lighter than it appears when the wool is wet.

Materials to Use

A great many vegetable substances will dye wool, and a few others such as cochineal, which, while not of vegetable origin, comes under the heading of a natural dye, being made from minute insects. I cannot do better than quote a very useful little table put out by the W.E.A. under one of their box lecture schemes at Massey College, which gives a useful summary of the more common sources of material and the mordant to use with each, but I would emphasise again that natural dyes in most instances will not produce very brilliant colours, but rather pleasing soft, warm tones.

Acknowledgments

I wish to thank Miss L. Harper and Mrs. P. R. McMahon for helpful suggestions and criticisms during the preparation of this article.

Useful Books

"Complete Guide to Hand Spinning," by K. Grasett. Published by the London School of Weaving, 13 Bryanston Street, Marble Arch, London, W.1. Price 2s. 6d.

"Scouring and Dyeing," by K. Grasett. Same publishers and price as above.

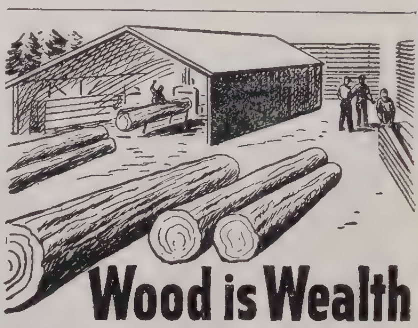
"The Use of Vegetable Dyes for Beginners," by Violetta Thurston. Published by the Dryad Press, Leicester, England.

"Spinning Wool," Dryad Leaflet No. 83. By the same publishers as the above.

All photographs and illustrations by the author.

Table for Using Mordants

Colour.	Source.	Mordant.
Black (blue)	Maire bark (Eugenia maire)	Alum
..	Hinau bark	Alum
..	Mako Mako (Aristotalia racemosa)	Alum
..	Dock root	Alum
..	Blackberry shoots	Iron sulphate
Blue	Indigo	Alum
..	Privet berries	Bichromate of potash
Blue (grey)	Blackberries, privet berries	Iron sulphate
Blue (lilac)	Elderberries	Alum and salt
Brick	Coprosma grandiflora	Bichromate of potash
Brown (yellowish)	Lichen	None required
Brown	Walnuts (green)	Alum
..	Manuka bark	Alum
..	Rimu bark	Alum
..	Bracken tips	Bichromate of potash
Brown (red)	Tanekaha bark (celery-leaved pine)	Alum
Brown (tan)	Flax (root and base of leaves)	Alum
Brown	Bluegum bark	Alum
..	Wattle bark	Alum
Crimson	Rock lichen	Alum
Grey	Walnut husks	Alum
..	Coal soot	Alum
Grey (warm)	Lichen	No mordant
Green	Lichen	No mordant
..	Moss (birch)	Alum
..	Elder leaves	Alum
..	Bidi-bidi	Alum
..	Spinach	Alum
..	Sorrel	Alum
..	Ivy leaves	Alum
..	Gum leaves	Alum
Magenta	Dandelion	Bichromate of potash
..	Sundew	
Old gold	Coprosma robusta (karamu)	Alum
Orange	Onion skins	Bichromate of potash
..	French marigolds	Bichromate of potash
..	Wallflowers	Bichromate of potash
Pink (fawn)	Flax flowers (unopened tips)	Bichromate of potash
Pink	Peach leaves	Alum
Petunia	Coprosma (areolata)	Stannous chloride and cream of tartar
Red	Cochineal	Alum, pepper and cream of tartar
..	Lichen (limestone)	No mordant
..	Sorrel (roots)	Alum
Purple	Wild cress	Alum
Violet	Wild cress	Alum
..	Lichen	Alum
Wine	Passion-fruit skins	Alum
Yellow	Dock leaves	Alum
..	Heather	No mordant
..	Reseda Luteola (wild mignonette)	Alum
..	Barberry bark	Alum
..	Mulberry bark (fustic)	Alum
..	Bracken roots	Alum
..	Lichen (tree and fence)	No mordant
..	Kowhai (flowers)	Alum and ammonia
..	Wallflower	Alum and ammonia
..	Fennel	Alum
Khaki	Walnut husk and gum leaves	Alum
..	Broom twigs	Alum



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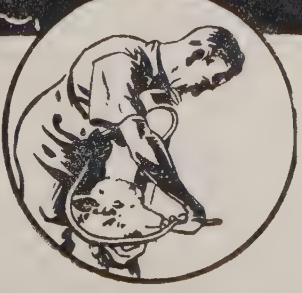

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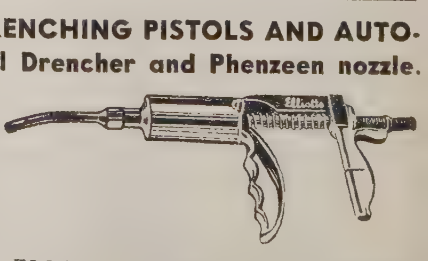

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FARMING IN NEW ZEALAND

Statistical Summary

RETURNS of agricultural and pastoral statistics in New Zealand (with the exception of those for sheep at April 30, which are the responsibility of the Department of Agriculture) are collected annually by the Census and Statistics Department through a combination of the postal and police officer personal canvass systems. Land held by Maoris under the communal system, unoccupied Crown land, areas under one acre within counties, and all areas within cities, boroughs, etc., are excluded. Numbers of livestock within city and borough boundaries are enumerated at intermittent periods.

By

W. N. PATON,
*Senior Investigational Officer,
Rural Development Division.*

THE statistics are tabulated by counties and by land districts, but in the latter tabulation land districts adopted by the Government Statistician are simple aggregations of complete counties which give the nearest approximation to the actual land districts as laid down by the Lands and Survey Department.

Main Features Pictured

For the purposes of a general review of farming in New Zealand a statistical summary is provided showing by statistical land districts for the season 1941-42 (the last season for which full details are available) the acreages of occupied land under various aggregations of crops, gardens and orchards, etc., plantations, grassland, bush, scrub, etc., and also numbers of the principal classes of livestock carried. Separate maps for the North and South Islands are included to show the delineation of statistical land district boundaries. By means of these tables and maps, and general remarks, the reader will be enabled to form a picture of farming in New Zealand in so far as its main features are concerned.

Occupied Land

The total area of New Zealand proper (North, South and Stewart Islands and adjacent islands) is about 66⅓ million acres, of which 43 million acres is occupied, exclusive of the total area represented by cities, boroughs, Maori communal land, and holdings within counties of less than one acre in extent. The balance of the land is comprised of areas mentioned as excluded from the previous total and areas reserved for public purposes (over 16 million acres), and also areas almost entirely unsuited for settlement (about 7 million acres), such as mountains, lakes, rivers, and barren areas. Areas of the last-named category are embraced also within certain of the public reserves.

Otago and Canterbury statistical land districts have the largest totals for occupied land (over 8 million acres each), followed in descending order by Wellington (over 5 million acres), Auckland, Southland, and North Auckland (between 5 and 3 million acres each). Then follow Hawke's Bay, Marlborough (between 3 and 2 million acres each), Gisborne, Taranaki, Nelson (between 2 and 1 million acres each), and lastly Westland, with just under one million acres of occupied land. Of the total occupied area the North Island accounts for 44 per cent. and the South Island 66 per cent.

PRODUCTION BY DISTRICTS.

Although no data are available giving total farm production by districts, assessments have been made in order to provide some idea of the relative importance of districts in the Dominion's farming economy, and of how they rank in the production of meat, wool, butterfat, etc. These assessments are based on a normal production year and valued at approximate farm-gate prices to the farmer for the 1941-42 season.

Livestock Value

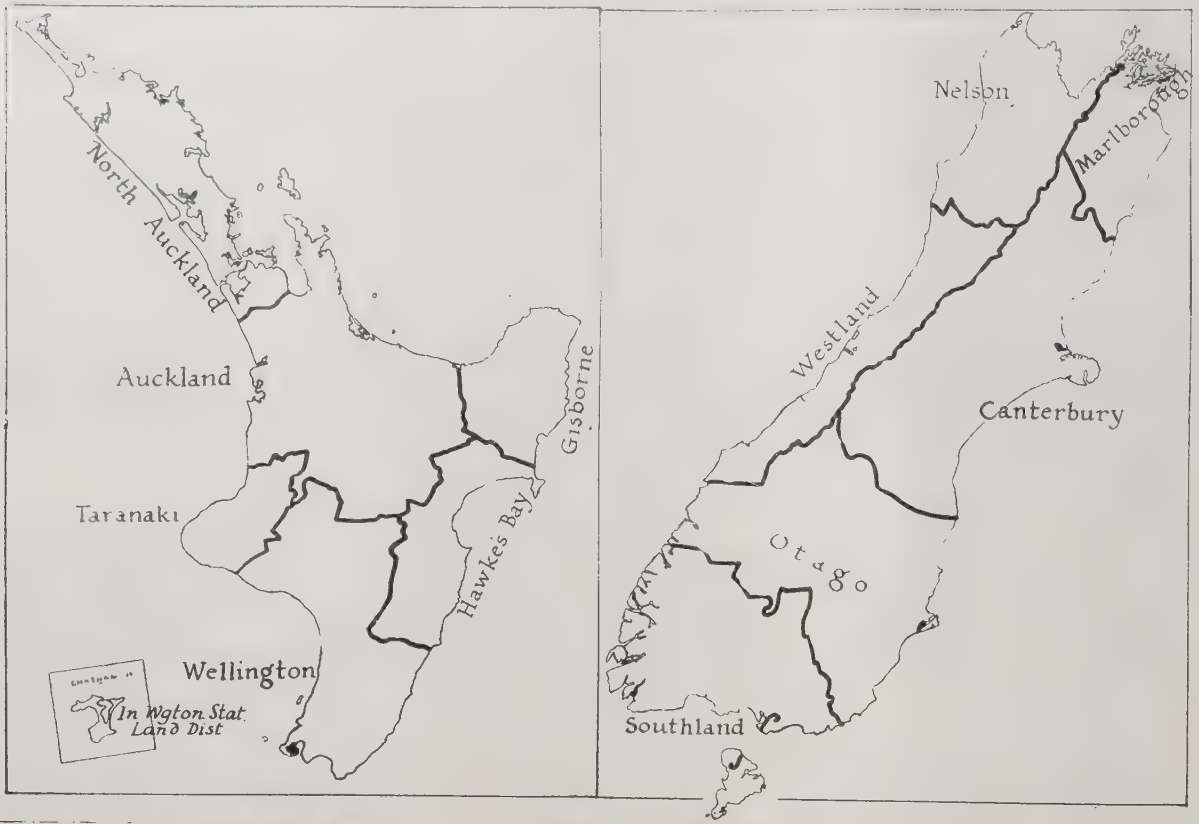
For total value of livestock production Auckland statistical land district ranks first with 22 per cent. of the Dominion total. Then follow Wellington and North Auckland with 18 and 12 per cent. respectively. Next in order is Canterbury, with just over 9 per cent., and Taranaki and Hawke's Bay, with a little under 9 per cent. each. Otago and Southland come next on about equal terms, with a little over 6 per cent. each. Gisborne ranks next with a little over 5 per cent., and Marlborough, Nelson, and Westland together account for just under 4 per cent. of the Dominion total.

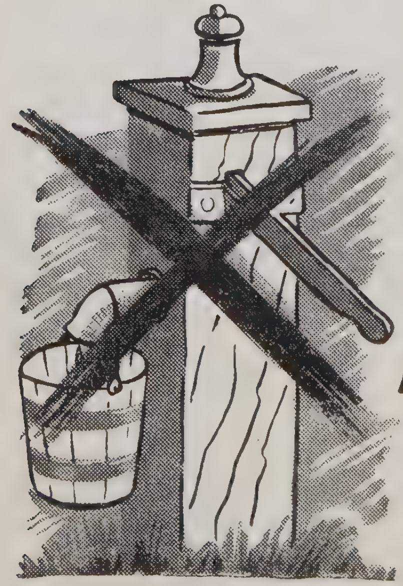
It will be seen from this that the North Island accounts for three-quarters of the total livestock production. When agricultural produce (other than livestock products) is taken into account Canterbury receives a considerable lift and displaces North Auckland for third place, but the relative positions of Otago and Southland remain unchanged.

Butterfat

Auckland is by far the most important butterfat-producing district, accounting for one-third of the Dominion total. The next most important is North Auckland, followed by Taranaki and Wellington on about equal terms. Of the total value of milk and butterfat utilised the North Island contributes seven-eighths and the South Island one-eighth.

STATISTICAL LAND DISTRICT BOUNDARIES OF NEW ZEALAND.


North Auckland
Auckland
Taranaki
Wellington
Gisborne
Hawke's Bay
In Wgton Stat. Land Dist
Nelson
Marlborough
Westland
Canterbury
Otago
Southland



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The total cattle population of the Dominion in 1941-42 was 4,640,000. Gross meat production was about 1,200,000,000lb., and butterfat production 440,000,000lb.

Clip Wool

In clip wool production Wellington leads by a wide margin, being responsible for about one-quarter of the total for the Dominion (value basis). Hawke's Bay and Canterbury come next on an approximately equal footing, with about one-seventh each of the Dominion total.

The remaining important wool-producing districts in descending order are Otago, followed by Auckland and Southland on about equal terms, and then Gisborne. The North Island contributes a little over 60 per cent. of the total value of clip wool production.

Meat Production

The premier meat-producing district is Wellington (about 19 per cent. of total value for the Dominion), followed by Auckland (15 per cent.), Canterbury (over 13 per cent.), and Hawke's Bay (over 12 per cent.). Next in descending order are Otago, Southland, North Auckland, and Gisborne, all fairly close together.

Of the Dominion total the North Island contributes almost two-thirds. The dairy industry by way of pigmeat, veal, and beef (cull dairy cattle) is responsible for a high proportion of district totals for total farm value of meat production in the case of North Auckland, Auckland, Taranaki, and Wellington. Beef production from cattle of the beef breeds is important in the Wellington, Hawke's Bay, Gisborne, and Auckland districts. Lamb and mutton production is highest in Wellington; Canterbury is second, Hawke's Bay third, Otago fourth, Southland fifth, Auckland sixth, and Gisborne seventh. Pig-meat, veal, and beef production is not important in South Island districts, which in all account for about 12 per cent. of the combined Dominion value-total of these products. On the other hand, the South Island contributes 45 per cent. of the total combined value of mutton and lamb.

Canterbury is the outstanding cash crop district by a very wide margin, the only others of major importance being Otago and Southland.

Value Per Acre

The highest average value of farm products per acre is achieved by Taranaki, next highest being Auckland, North Auckland, Wellington, Hawke's Bay, and Gisborne, in that order. Much depends on the proportion of improved to unimproved land, and therefore it is not surprising to find all highest places being held by North Island districts. Of South Island districts Southland holds top position in this respect, closely followed by Canterbury and Nelson.

Types of Holdings

Of New Zealand's total of 86,000 holdings of one acre or more in area (exclusive of cities and boroughs, Maori communal land, etc.) about 75,000 run dairy cattle and/or sheep. This latter total is comprised approximately of (1) 8,000 holdings running only house cows; (2) 10,000 holdings representing what may be termed part-time dairy herds (5-19 cows in milk); (3) 19,000 dairy farms proper; (4) 7,000 dairy farms with sheep as a side-line; (5) 4,000 dairy-and-sheep farms; (6) 5,000 sheep farms with dairy cows as a side-line; and (7) 22,000 sheep farms proper, running only house cows as well.

It may be said that there are about 31,000 sheep farms, 30,000 dairy farms (4,000 farms being duplicated as between these two groups), and 10,000 part-time dairy farms.

We could add 7,000 side-line sheep flocks to the sheep group which already are included in the dairy group, and 5,000 side-line dairy herds to the dairy group which already are included in the sheep group, but only at the expense of increasing duplication. Cash crop production is carried on mostly within sub-groups (1), (2), and (7). Beef production is associated mainly with sheep farming, and to a limited extent with dairy farming. Where dairy cows are run only to the extent of more or less house cow numbers, these may be increased to

Use of Occupied Land for Farming, Season 1941-42

(excluding areas within cities, boroughs, etc.) Census and Statistics Department data.

Table LXXIII—Use of Improved Land, showing Areas in Cultivation, Sown Grassland, etc. (Acres).

STATISTICAL LAND DISTRICT.	Cereal, Pulse & Seed Crops. (Threshed areas only.)	Fodder Crops. (Mostly roots and green-feed, chaff, & cereal crops fed off.)	Potatoes & Onions.	Industrial & Other.	Total Area in Annual Crops.	Orchards, Tung, Grapes, Passion Fruit, Hops, Market Gardens, Nurseries, etc.	Private Gardens & Residential Grounds.	Plantations.	Fallow Land.	Grasses, Clovers, & Lucerne. (Less double sown with fodder crops, etc.)	Total Area Cultivated.
North Auckland ..	589	8,347	1,382	152	10,470	6,131	10,657	30,495	10,274	1,778,239	1,846,266
Auckland	3,719	43,269	747	242	47,977	2,209	12,682	610,476	16,243	2,460,012	3,149,599
Gisborne	4,786	3,130	258	436	8,610	589	2,914	2,302	558	1,577,997	1,592,970
Hawke's Bay ..	2,818	40,814	581	581	44,794	3,732	5,217	10,102	2,202	1,894,283	1,960,330
Taranaki	128	13,221	116	4	13,469	224	4,687	4,088	570	956,505	979,543
Wellington ..	7,264	54,733	2,132	59	64,188	2,851	10,788	37,527	4,895	3,657,890	3,778,139
Marlborough ..	20,629	14,894	186	1,274	36,983	672	2,110	3,463	1,439	361,809	406,476
Nelson	3,320	9,582	438	2,453	15,793	5,622	2,275	33,568	1,241	298,656	357,155
Westland	—	1,105	14	—	1,119	34	705	3,678	2,032	132,295	139,863
Canterbury	295,319	345,148	7,992	10,533	658,992	4,108	16,774	76,939	45,420	1,901,461	2,703,694
Otago	49,485	152,119	1,326	4,054	206,984	4,198	8,043	37,979	20,944	1,244,149	1,522,297
Southland	25,905	159,841	854	4,271	190,871	234	6,176	7,316	4,678	1,189,167	1,398,442
New Zealand ..	413,962	846,203	16,026	24,059	1,300,250	30,604	83,028	857,933	110,496	17,452,463	19,834,774

Table LXXIV—Unimproved Occupied Land (Acres).

Statistical Land District.	Phormium (New Zealand Flax.)	Tussock & Other Native Grasses.	Fern, Scrub, & Second Growth.	Standing Native Bush.	Barren & Unproductive Land.	Total Unimproved Occupied Land.
Nth. Auckland	4,064	142,212	772,951	278,322	57,140	1,254,689
Auckland ..	8,714	112,907	950,701	446,508	69,613	1,588,443
Gisborne ..	471	49,593	151,757	171,216	14,442	387,479
Hawke's Bay	153	399,451	256,909	97,218	38,294	792,025
Taranaki ..	226	8,211	144,276	216,220	12,691	381,624
Wellington ..	7,993	518,681	435,561	309,305	102,985	1,374,525
Marlborough	2,337	1,125,214	243,410	128,808	355,364	1,855,133
Nelson ..	3,499	239,498	298,749	280,820	17,229	839,795
Westland ..	6,372	118,895	171,041	381,699	166,256	844,263
Canterbury .	2,879	4,477,924	138,485	114,849	655,870	5,390,007
Otago ..	2,391	5,359,257	479,705	339,036	416,448	6,596,837
Southland ..	8,165	1,317,487	306,030	121,883	104,241	1,857,806
New Zealand	47,264	13,869,330	4,349,575	2,885,884	2,010,573	23,162,626

Table LXXV—Numbers of Holdings and Average Size.

Total Occupied Land (Acs.)	Number of Holdings.	Average Area of Holding. (Acs.)
3,100,955	14,980	207
4,738,042	14,135	335
1,980,449	2,717	729
2,752,355	5,105	539
1,361,167	5,615	242
5,152,664	11,378	453
2,261,609	1,849	1,223
1,196,950	3,492	343
984,126	1,168	843
8,093,701	12,351	655
8,119,134	7,275	1,116
3,256,248	5,933	549
42,997,400	85,998	500

Table LXXVI — Sown Grassland saved for Seed, Hay, Ensilage (Acres).

Grasses, Clovers, & Lucerne.	
Total Area Saved for Seed.	Total Area Cut for Hay & Ensilage.
90	66,277
38	190,600
1,265	9,504
5,533	20,406
4	80,234
2,736	58,260
5,055	7,294
532	11,631
—	2,943
79,405	44,258
24,366	32,089
36,000	31,790
155,024	555,286

Table LXXVII—Total Livestock in the Dominion

(including those within cities, boroughs, etc.)

STATISTICAL LAND DISTRICT.	AS AT JANUARY 31, 1942—						AS AT DATES CONCERNED, 1941-42—			AS AT APRIL 30, 1941—	
	Total Horses.	Dairy Cows in Milk.	Beef Breeding Cows.	Total Cattle.	Breeding Sows.	Total Pigs.	Sheep Shorn.	Lambs Shorn.	Lambs Tailed.	Breeding Ewes.	Total Sheep.
North Auckland ..	31,423	378,455	65,904	779,028	19,567	148,827	1,113,561	269,408	649,206	724,210	1,150,838
Auckland	47,345	604,713	112,328	1,231,239	33,456	244,182	2,580,897	686,704	1,792,809	1,775,470	2,628,023
Gisborne	13,518	45,459	120,166	352,650	3,234	21,706	2,206,470	823,807	1,077,622	1,308,055	2,371,709
Hawke's Bay ..	16,880	58,525	120,907	382,474	2,996	22,547	3,947,839	784,277	2,507,480	2,764,152	4,265,823
Taranaki	15,506	229,687	27,179	415,017	8,605	67,745	843,952	242,490	527,809	512,956	798,963
Wellington	35,953	234,155	182,410	867,546	11,906	85,757	6,487,464	1,668,128	4,049,038	4,224,544	6,756,114
Marlborough ..	5,527	13,645	8,412	44,770	728	6,065	1,033,907	28,803	471,633	615,520	1,183,400
Nelson	5,121	32,462	6,839	74,069	2,278	18,854	395,467	12,046	172,187	256,471	464,170
Westland	2,031	12,691	7,618	46,154	731	6,249	71,129	5,758	59,347	60,830	86,577
Canterbury ..	39,954	66,132	21,819	171,369	5,012	41,859	4,439,925	52,042	3,065,885	3,369,370	5,100,459
Otago	26,213	40,502	15,678	117,903	1,862	15,990	3,466,783	10,168	2,052,056	2,316,052	3,939,371
Southland	22,140	60,813	20,597	159,495	963	8,896	2,638,205	5,433	2,098,218	2,103,303	3,006,213
New Zealand ..	261,611	1,777,239	709,857	4,641,714	91,338	688,677	29,225,599	4,589,064	18,523,290	20,030,933	31,751,660

The 29,200,000 sheep and 4,600,000 lambs shorn in the Dominion in 1941-42 produced 284,000,000lb. of clip wool (greasy basis). Sheep and lambs slaughtered yielded an additional 61,000,000lb. of slipe wool, etc.

side-line dimensions in times of economic adversity in order to provide ready income month to month.

Sizes of Holdings

Dairy farms average in size from about 50-150 acres in the various districts of the North Island, and from about 30-140 acres in the South Island (30-85 exclusive of Westland), when all part-time dairying is included. Apart from part-time herds, the greatest concentration in numbers is for the range in size 50-75 acres. Sheep farms average in size by districts from about 750-1,100 acres in the North Island, exclusive of Gisborne (750-2,100 inclusive of Gisborne). In the South Island they vary from 1,500-3,400 acres, exclusive of Nelson, and from about 900-3,400 inclusive of Nelson. Strangely enough, the greatest concentration in numbers of sheep farms in the Dominion centres on the group 200-250 acres. These are undoubtedly fat lamb farms presumably mainly located in the South Island, and particularly in Canterbury.

Where dairying and sheep farming are associated together the average size of holding varies by districts from about 200 acres to 600 acres, with the greatest concentration in numbers for the 200-250 acre group. Since Hawke's Bay, Canterbury, Otago, and Southland show appreciably lower average sizes than the other districts for farms of this class, it may be assumed they contribute most to the modal point, 200-250 acres.

Cash crop production in New Zealand is carried on mostly in conjunction with livestock farming in order to maintain soil fertility. Average cropping and sheep farming holdings vary in size from about 350-500 acres. Canterbury accounts for the bulk of these, and Otago and Southland, and to a lesser extent Marlborough, account mainly for the remainder. The most common size of holding of this type (i.e., modal size) is 200-250 acres.

There is another group of farms, best described as mixed farming also responsible for cash crop production, but of considerably less importance than the preceding one. For the same four districts holdings vary in average size from about 100-200 acres, the modal size varying between 40 and 75 acres. This class of farming involves both dairying and sheep farming in conjunction with cash crops, and is located mostly in Canterbury, with the other three districts being responsible for the bulk of the remainder, as in the case of the cash crop-sheep farming group.

There is a large number of small holdings in New Zealand, varying in size up to about 30 acres, which either represent intensive small-holding enterprises, such as orchards, market gardens poultry and bee farming, hop and tobacco growing, etc., or represent part-time dairy farms, where the occupier has other employment. Part-time dairying predominates in this group to a heavy degree, the next most important being market gardening and fruit growing.

A proportion of such holdings run mixed enterprises of the intensive small-holding type. These small holdings are found in greatest numbers usually around the main urban centres. Many of them are not included in agricultural and pastoral statistics, as they lie within city and borough boundaries.

The average size of all classes of holdings varies appreciably from district to district. Marlborough ranks first for average size of holding, closely folowed by Otago and Westland. Next highest are Gisborne and Canterbury, then Hawke's Bay, Southland, Wellington, Nelson, Auckland, Taranaki, and North Auckland. Large dairy herds are found principally in Auckland, Taranaki, North Auckland, and Wellington, and small dairy herds (excluding the bulk of the part-time herds) in greatest numbers in North Auckland particularly, and also in Auckland Wellington and Canterbury. A good proportion of these latter herds represent town-supply milk farms. Large sheep flocks occur in greatest numbers (in descending order) in Wellington, Hawke's Bay, Canterbury, Otago, and Gisborne statistical land districts.

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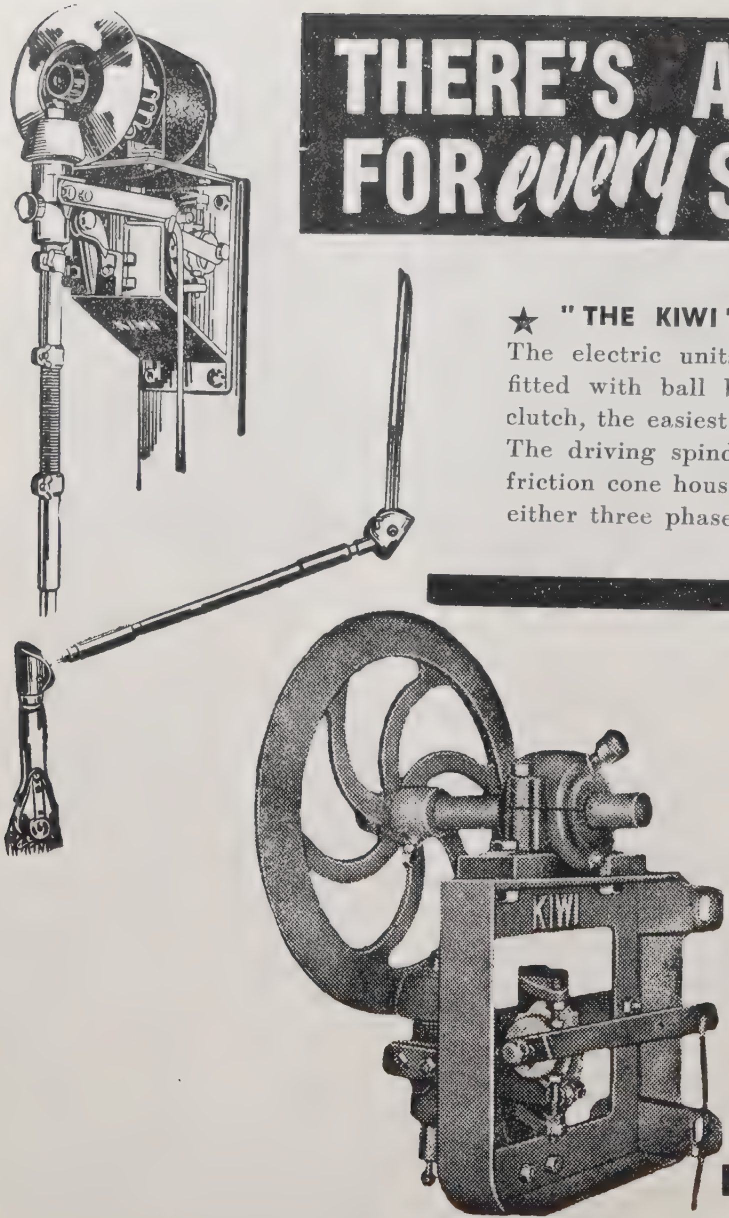

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Above — Picking Lloyd George variety in a Bowenvale garden, Christchurch. Note the healthy, vigorous appearance of the canes.

Raspberry Culture in New Zealand

THE raspberry is the most extensively planted berry fruit in New Zealand, and has increased in popularity as a choice dessert fruit. Raspberries have always been largely used for jams and preserves.

By

J. H. WATT,

Fruit Inspector,

Christchurch.

RASPBERRY culture, though somewhat specialised, has advantages over that of tree fruits, as the plantation is more readily established at relatively low cost, and commences to bear in the second year from planting. The fruit matures early in the season, the spring frosts are rarely sufficiently severe to cause much, if any, damage and loss of fruit; also, should the plantings become unprofitable for any reason, it is not a very costly matter to clear the land of the canes. On the average, depending on the variety planted, the incidence of disease, and growing conditions, the raspberry plantation will yield 6 to 8 crops before deterioration commences to set in. The average production from a good plantation ranges from 25cwt. to 40cwt. per acre.

Location

Raspberry culture succeeds best in temperate climates and in those localities having relatively high summer temperatures and low winter temperatures. The colder climate is necessary for the proper ripening of the canes, and it also retards undue suckering, which, if unchecked, detrimentally affects the fruiting ability of the plant. Owing to the perishable nature of the fruit, the plantation should be located near to a centre of population where the fruit may be marketed without undue delay.

Factors which enter into the selection of the site of a plantation are: Soil type, moisture supply, drainage, freedom from late frosts, and protection from winds. A sunny situation is desirable. The raspberry thrives best in a deep, rich, moist, well-drained sandy loam, and on no account should the plantation be set out on a soil which readily becomes waterlogged. Soils which are well drained but lacking in organic matter may be built up by ploughing in green crops with decayed manure or vegetable refuse. A drought affects not only the current crop, but also the development of the healthy, well-grown new canes. An ample supply of moisture is essential to satisfactory development of the berries, especially during the ripening period. It will be necessary in climates of low rainfall to make provision for the irrigation of the plantation. While ample moisture is necessary, at no time, however, should there be wet patches in the plantation, as stagnant moisture is fatal to the canes. Though risk of damage from spring frosts may be slight, it is as well to select a site where the risk will be minimised. Where natural shelter is insufficient shelter belts should be provided.

If drainage is necessary, it should be put in hand before the plants are set out in the land; unless the soil has adequate drainage, the life of the plantation will be of shorter duration than it should be.

Preparation of Soil

The thorough preparation of the soil is the first essential in the establishment of the plantation. Before the final cultivation for planting any part of the land where gravity irrigation is necessary must be levelled, otherwise there will be difficulty in watering the plantation. Land should not be ploughed out of the sod and immediately planted, but should be deeply cultivated for at least a year by the growing of potatoes or peas. The humic content should be built up by ploughing in at least one good green crop, as the fertility and mechanical condition of the soil cannot be so readily improved after planting. Cultivation can, however, be maintained during the spring and summer months. All persistent weeds, such as twitch and convolvulus, must be eradicated before planting, as only shallow cultivation can be maintained after the plantation is established.

In domestic gardens the soil should be trenched two full spades deep. In digging the second spit of soil a good application of well-rotted manure or compost should be incorporated in the soil, along with a dressing of up to 5oz. of blood and bone per square yard. If the ground should be heavy, a good dressing of lime, 4 to 5oz. per square yard, will effect great improvement.

CANTERBURY

Metropolitan

SHOW

The Canterbury Agricultural and Pastoral Association desires to intimate to breeders and prospective exhibitors that the Metropolitan Show will be held on the Showgrounds, Addington, in November, 1945.

A full Schedule of Stock Classes will be issued in September.

M. E. LYONS,
Secretary,
Box 296, Christchurch.

Varieties

The varieties recommended are Antwerp Red, Northumberland Fillbasket, Lloyd George, and Great American. Other varieties are grown to a limited extent, but a selection from the above is recommended.

Selection of Canes

Those intending to set out new plantations are urged to take every precaution to secure only sound, well-grown, disease-free plants from healthy, vigorous, and productive plantations. Profitable results cannot be expected from weak stocks and any trouble to which a grower may go to secure good plants will repay him, especially as suckers from these original plants may be obtained in later years for extended plantings. For transportation the plants should be adequately protected from drying out and be carefully packed and handled.

Care After Arrival

If the plants are not to be set out immediately they are received from the nursery, they should be heeled in by placing in a shallow trench and covering the roots with moist soil, which should be worked right in among the roots. Should the roots be dry when unpacked, it would be advisable to soak them in water before heeling in. Do not allow the roots to dry out, and protect them from wind when planting as any check sustained at this stage may take a considerable time to overcome.

Planting

Autumn planting in situations where the soil does not lie wet and cold during the winter months has definite advantages over spring planting. There is usually more time to do the work; during the winter the plants become firmly established and get a good start in the spring; and as the buds are dormant they are not so easily damaged as in the spring. Some growers, however, may prefer to wait until the spring before planting. In such cases the planting should be undertaken as soon as the ground is in a suitable condition for working. Should, however, the land and the weather be too dry, especially in times of drought, the plants may receive a check from which they may never fully recover.

In setting out the canes the depth of the hole should correspond with the depth the plants were in the soil before they were lifted. This can be determined by rubbing off the soil towards the base of the stem so as to reveal the point on the canes where earth and air met as the plant stood in the nursery beds. This will allow for the canes being planted about six inches deep, and for the development of roots, and for a good depth of cultivation being maintained.

The bottom of the hole should be slightly raised in the centre, and the soil trodden moderately firm. The hole will then be ready to receive the plant. Fine soil should be spread over the roots. The plant should be gently shaken up and down so that the soil will settle in closely about the roots. Firm the soil and apply from 1½ to 2oz. of blood and bone. Continue to fill in the remainder of the earth and firm it, leaving the soil immediately around the canes a little higher than the level of the surrounding soil to allow for a slight subsequent settling of the ground. The canes should be cut back to about 6in. of the ground when planted out. New canes are not cut back

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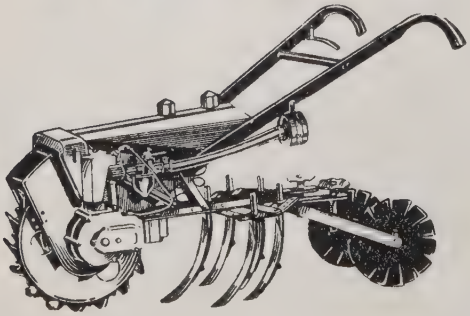

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Aerial view of a large well-maintained raspberry garden in Canterbury.

until the time to prune in the late autumn or early winter as described in the section on pruning.

Cultivation

Raspberry plants are surface rooters, and shallow cultivation only should be maintained throughout the growing season to keep down weed growth and to conserve moisture. After the initial shallow ploughing or rotary hoe work in the early spring periodic grubbing or hoeing should be maintained between the rows. Hand work round the plants may be necessary to keep down weeds and to prevent undue drying out. This work must be carried on till late summer to help mature the crops and to obtain full growth in the new canes after pruning.

Systems of Planting

There are three main systems of planting raspberries:—

1. **The hill system:** A number of canes are planted in groups, each group being 5 to 6ft. apart each way. This allows all-round mechanical cultivation to be maintained throughout the season, and reduces hand labour to a minimum.

This system varies considerably in different districts. In Nelson, for instance, where this system is extensively adopted, 6 to 8 canes are planted together, but stakes for support are not usual. After planting pruning is carried out in the normal way.

In subsequent years the treatment is to tie loosely with binder twine the new canes retained for cropping when the old canes are cut off at ground level. Topping of new canes is the standard practice. After the first year's growth canes are gathered into a bunch and cut with a sickle at about 3ft. In the second year, when the hills are fully established, and if growth is strong, topping is carried out at a height of 4ft. to 4ft. 6in.

In Canterbury and Otago, however, a strong stake about 6ft. long is driven firmly into the ground and 4 to 6 canes planted round and tied to it. After pruning in subsequent years the canes are immediately tied up to the stake to prevent damage through wind lashing and implements used in cultivation. The use of stakes also eliminates the necessity of topping the canes so that the maximum crop can be produced.

The number of canes to each hill soon increases, and after the second year it is normal practice to remove all excess canes as well as all spent ones, so that the remainder are well spaced to allow easy access for working and ample light for quick ripening.

2. **The modified hill system:** 4 to 6 canes are planted in each stool, and loosely tied at the tips so that all-round mechanical cultivation can be maintained after autumn pruning, and in the early spring until the canes are tied down. The canes are loosely tied together with twine early enough to avoid damage to the young growth about 6 to 8in. from the tips and then bent over and tied to the base of the next stool in the row. This system reduces the amount of hand cultivation, and also by tying them in rows in the direction of the prevailing wind it streamlines the canes and minimises the possibility of wind damage.

Panorama of well-laid-out area in Canterbury showing in the foreground the hedge method of planting raspberries.

Approximately 8,000 canes per acre are required under the above-mentioned systems.

3. **The hedge type:** In this plantation the canes are planted singly 2ft. apart in rows 5 to 6ft. apart, and strong posts are placed at each end of the row with intermediate posts or strong stakes. Four wires are usually used in pairs 2ft. and 3ft. 6in. above the ground. The new canes are drawn up between the wires after pruning—the wires are tightened by the use of small S hooks about every 8ft. This gives a good strong fence which supports the canes and gives easy access for picking and spraying. After the crop is picked the wires are let down and the canes pruned. After pruning the wires are brought up again and the new canes are again in position for cropping.

This system allows only one-way mechanical cultivation, and more hand work is necessary than in either of the other two systems of culture. Approximately 4,500 canes per acre are required.

Pruning

It is not advisable to gather a crop of berries the first season after planting; a delay of a season will enable the bed to become well established. From a fortnight to a month after planting in the spring cut the canes down to a height of 6 to 12in. from the ground. Strong canes should be produced to carry the crop in the following summer. While the general practice is to commence pruning in the autumn when the canes become defoliated, owners of plantations are recommended to prune summer-fruiting raspberries as soon as the berries are picked. By following this practice the canes selected to carry the next season's crop will be fully exposed to the sunshine, which will materially assist to ripen the canes, and the food supply will be diverted to the remaining canes. Pruning consists of the removal at ground level of all the canes just cropped and the reduction of the number of new season's canes, depending on the vigour of the canes and the system of culture. In the case of the hill system the number of canes left is usually 10 to 16, in the modified hill system 6 to 10, and in the case of the hedge system 4 to 6 canes per stool are usually sufficient. The canes thus removed should be burnt to destroy any diseases present, and the new canes tied up to allow spraying and cultivation to be carried out. While no summer pruning or tipping of the canes is carried out, it is usual to cut the canes back while they are dormant to a height of 5ft. to 5ft. 6in.

The photograph illustrates a pruning tool evolved by a Canterbury raspberry-grower, which consists of a slasher handle fitted with a wrought-iron holder, which carries the cutting blade, made out of motor-car spring steel. The V-shaped cut is bevelled both sides to a fine cutting edge.

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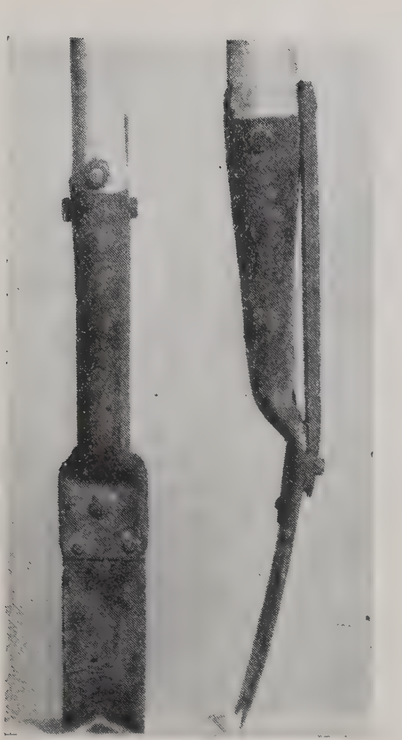


A strong home-made pruning tool for removing old canes at ground level.

The old canes to be removed are cut off close to the ground level by a thrusting movement. The implement is strengthened by a piece of bar iron visible in the photograph showing the side elevation.

Late Autumn Treatment

Tie the canes according to the system of planting adopted, and loosen the soil to a depth of 3 or 4in. with a fork, if the area is small, or with a rotary hoe in the larger areas. Avoid deep cultivation within reach of the roots. A serious mistake frequently made in many raspberry plantations is due to the honest zeal of the labourer who digs over the bed with a thoroughness and penetration worthy of a better cause. Quite innocently many of the fibrous roots close to the surface are destroyed by such treatment, with the result that a reduced crop is harvested. Light surface cultivation with a hoe or a fork is recommended. Conscientious and untiring efforts with the hoe are of great advantage during periods of prolonged spells of dry weather in maintaining a good soil mulch.

Apply up to a three-inch layer of well-rotted manure or compost. The manure should be worked into the soil in the spring.

Manuring

As the raspberry is a gross feeding plant annual applications of fertiliser are necessary for the maintenance of soil fertility and the production of good average crops.

An application of the following fertiliser mixture should be made in the spring at the rate of 7 to 10cwt. per acre:—

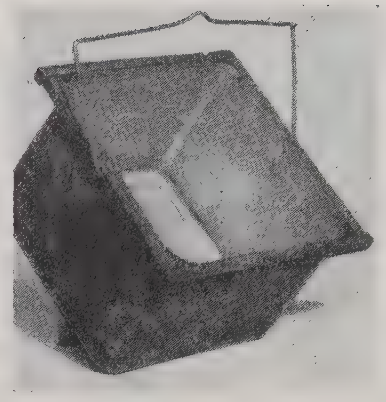
Superphosphate 44-46% ..	**3½ cwt.**
Sulphate of potash	**1½ "**
Dried blood	**½ "**
Sulphate of ammonia ..	**1½ "**
Total	**7 cwt. per acre.**

While this is considered an average dressing, it may be increased for application on the poorer soils to 10cwt. per acre.

The application of 1 ton of carbonate of lime per acre in the autumn every third year is recommended where the soil conditions are inclined to be heavy.

Harvesting

Pickings are usually made twice or three times weekly throughout the season. The berries are picked firm ripe into punnets for dessert purposes, and into 12lb. buckets for jam. The pickers do the necessary grading so that the handling of the berries is minimised. The fruit is then carted to the packing shed, crated, and dispatched to market. In some plantations the good dessert fruit is picked and the rest left to ripen fully. It is then picked into barrels for dispatch to the factory for pulping.

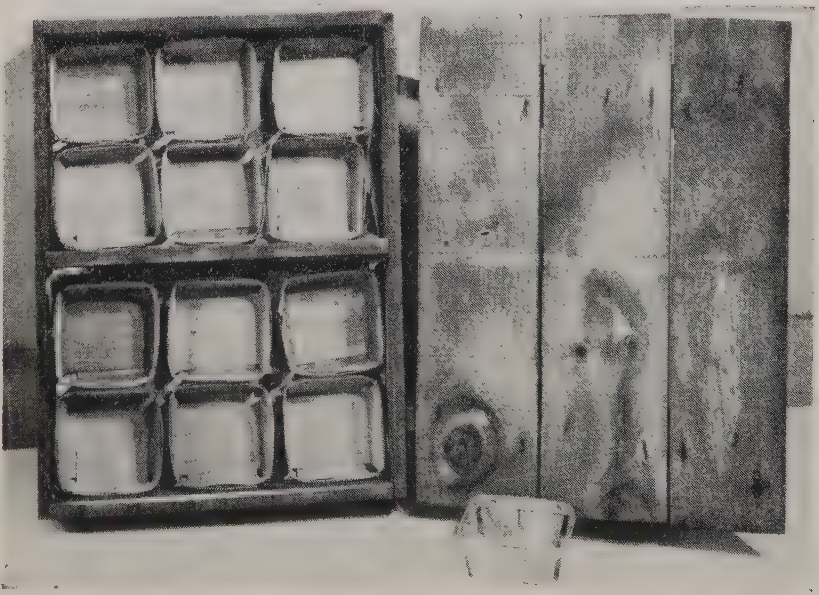


A strong light type of picking bucket lacquered inside and easily kept clean.

Picking buckets were formerly made of wood, but tins are now being more extensively used, owing to the lighter weight. A good type of picking bucket is illustrated. It is made from a petrol tin and the top edges are strengthened by the nailing on of a ½in. batten all round. These tins are generally coated with a varnish or lacquer on the inside, making them quite durable and satisfactory.

Crates are necessary for the transportation of the punnet fruit to market. They should be substantially made with a hinged lid. Crates to hold 12, 16, and 24 punnets are in use, but the one shown in the photograph is recommended. Its inside measurements are as follows: 21¾in. x 16¼in. x 4in., with a partition in the centre. This crate holds 12 punnets, and it is preferred in the markets, as the condition of the fruit in all the punnets can be seen at a glance and the number of punnets per crate appears to be suitable to buyers.

The life of the canes is largely governed by the locality and the type



A well-constructed crate with hinged lid with punnets for transporting berries to market. Inside measurements of crate are 21¾in. x 16¼in. x 4in.

of soil in which they are planted, and is also affected to some extent by the variety. A well-cared-for plantation on good soil will naturally have a longer cropping life than a plantation on a poorer soil type. The average cropping life before the plantation becomes uneconomic is 7 to 12 years. Many raspberry beds are run out and should be renewed.

Spraying

In most districts spraying of commercial plantations is limited to three or four applications of arsenate of lead (powder) at the dilution of 2lb. to 100 gallons of water for the control of bud-moth caterpillar, although in some areas where diseases such as cane-wilt and cane-spot are present it is necessary to use in addition Bordeaux mixture (3-4-50). The normal times for these applications are early spring, at fruit set, and once or twice after the fruit has been harvested. Where any of the pests or diseases listed below become established special control measures as outlined will be necessary.

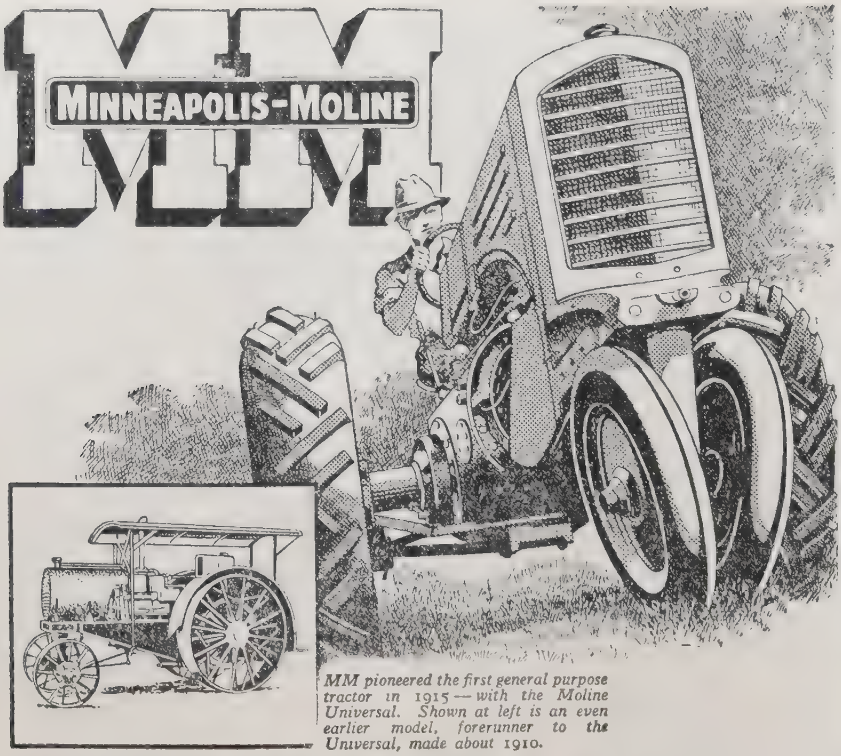
PRINCIPAL DISEASES AND PESTS AND THEIR CONTROL.

Raspberry bud moth (*Carposina adreptella*): The larva of the raspberry bud moth has been reported as having done much damage to the buds of new raspberry canes. It has often been the primary cause of crop failures. It is a small moth from 6 mm. to 10 mm. in length, varying in colour from very light brown to very dark brown or dark grey.

The moth lays its eggs in the late summer or autumn singly or in clusters, either in the crevices between the leaves, in a bud, or on the undersides of leaves. The eggs hatch in 5 to about 20 days. The larvae on emerging bore into the young dormant buds and eat away the kernel and finally destroy the buds. On occasions when the shoot is soft and sappy the larvae may tunnel up to three or four inches into it. It is from these and other similar buds that the laterals should develop in the spring to bear the coming season's crop. It is believed that the larvae pupate in the soil adjacent to the bushes.

Control: Unless effective spraying is carried out, the ravages of this pest will increase and spread throughout the plantation and seriously reduce the crop. The measures recommended for control are as follows:—

Prune the bushes as early in the autumn as practicable and destroy the prunings without undue delay. By this means moths which would have hatched out later in the season and laid eggs upon the lower buds on the canes would be destroyed before they had the opportunity to emerge.



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For the protection of the young growing canes apply lead arsenate (powder) 2lb. to each 100 gallons water (which is equal to approximately 1¼oz. to each 4 gallons water) when they reach a height of from 16 to 20in. Care should be taken, however, to avoid the spray coming in contact with the berries.

Grass-grub (*Odontria zealandica*): During recent years the larva of this insect has caused damage in raspberry plantations. It has been found to be most prevalent in land which has recently been ploughed out of pasture. It causes damage to the fibrous roots of raspberries with a resultant reduction of vitality in the canes. Its presence can readily be diagnosed by digging up a few of the sickly plants and examining the roots. If infection is present, the grubs will be found in the soil adhering to the fibrous roots, which will show signs of injury.

In the adult stage the beetle is brown in colour with a darker margin to the wing cases. It usually appears in large swarms in the evenings during the months of October, November, and December.

The female beetle lays her eggs near the surface of the ground, generally at the base of the plants, in the main during the above-mentioned months. The eggs hatch out in from 9 to 11 days. The grub is creamy white in colour, except for the brownish head, up to one inch long, and is characteristically curled into a semi-circle.

Control: Prior to planting fallow the land, if practicable, for one season. Where grass grub is persistently injurious, and the cost is justified, it is suggested that lead arsenate (powder form) at the rate of 3cwt. per acre be worked into the top three inches of soil following the levelling of the surface and before the plants are set out. After planting maintain clean cultivation in the plantation during the spring and summer months between the bushes. This should keep the area free from grass-grub for several years.

White rose scale (*Aulacaspis rosae*): This is a white mussel-shaped scale common on raspberries.

Control: To control spray in the dormant season with winter oil 1-20 or with lime sulphur 1-15.

Cane wilt (*Leptosphaeria coniothyrium*): This is a prominent fungous disease of raspberries in New Zealand in both well-managed and neglected plantations. This disease may be found on canes, foliage, and fruit spurs—it may affect a single branch or lateral, which wilts and dies, or the whole plant may become weakened and unthrifty. The diseased area of the wood is smoky in colour and becomes brittle at the point of infection; the wood often cracks and the bark peels off the lower portion of the cane. The berries on infected canes dry up and fail to mature. The disease may be spread by insects, wind and rain, or manually during picking and pruning operations. The fungous spores enter the canes through wounds, but are also apparently able to penetrate healthy bark and infect the canes. Dead or decaying canes are the main source of re-infection, and it is also thought that the spores are carried over in the soil.

Control: The critical period in regard to infection of raspberries is when the young canes are very small and possibly when they are first pushing through the soil, so that spraying must be done early in the growth of the canes.

Remove and burn all badly affected canes when they are observed. Thoroughly spray with Bordeaux 3-4-50 when young canes are about 6in. high, and repeat just before blossoming.

Cane-spot (*Elsinoe veneta*) is a serious fungous disease which affects the general health of the canes and so reduces the cropping capacity. The disease first attacks new canes in the spring and damages them so that the formation of fruit the following season is limited. In the early stages lesions appearing on the young canes are small, scattered, and purplish in colour, but as they spread they become greyish-white with purple edges. The most common manifestation of the disease is of extensive greyish superficial growths on the canes, which are most conspicuous on the sunny side. The grey appearance is due to the uniting of many small infections, and in advanced stages the canes appear irregularly blotched and often girdled. Sometimes severe cracking of the canes occurs and the pith is exposed. The purplish spots also appear on petioles and leaves, causing curling of the leaves, and the dropping out of diseased areas gives a shot-hole effect. Spores over-winter on old canes, and are spread to new ones by wind and rain throughout the growing season.

Control: Remove and burn all infected canes and maintain clean cultural conditions. Spray thoroughly with Bordeaux mixture 3-4-50 when the suckers are about 6in. high, and again just as the blossoms are showing white.

Silver-leaf (caused by *Stereum purpureum*): During a survey of small fruit culture carried out in December, 1939, raspberry plants bearing fructifications of *Stereum purpureum* on dead canes were found in several areas throughout New Zealand (Woodhead and Chamberlain, 1940).* The

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*Woodhead, C. E., and Chamberlain, E. E. (1940)—Orchardist of N.Z., Vol. 13, pp. 139-141.

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disease was observed in the Wairarapa, Nelson, and Canterbury districts. Although in no case the incidence appeared high, damage to infected canes was severe, these either dying or becoming so weak that they did not crop, and losses are therefore significant.

Infection occurs through pruning cuts and other wounded surfaces by means of spores produced on flat, leathery, disc-like fructifications which are frequently found on dead stumps, posts, and fallen logs. On raspberry the first sign of infection is browning of the leaf margin, followed by leaf-fall and gradual die-back of canes. Infected plants may put out fresh growth from the base, but these are eventually attacked and the whole plant dies. Fructifications may not be produced on dead canes until 6 months or more after infection takes place.

S. purpureum attacks a large number of plants, being common on pome and stone fruit trees, currants, gooseberries, and many ornamental trees, and shrubs such as broom, poplar, silver birch, tagasaste, and willow. Fructifications may appear at any time of the year, but more frequently during wet weather on branches that have been killed by the fungus. Dead branches and stumps of the above host plants act as sources of infection to neighbouring orchards and gardens.

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Control: The only control measures that can be recommended in the meantime are (a) removal and destruction by burning of all infected bushes; and (b) removal of sources of infection in the neighbourhood, i.e., dead stumps, branches, or fallen logs of susceptible hosts bearing fructifications of the causal organism.

Armillaria root-rot fungus (*Armillaria mellea*): Poor growth accompanied by yellowing and wilting of the foliage are the earliest symptoms, and these do not usually occur until considerable damage has been caused to the plant. The presence of the disease is usually suspected when individual plants or groups die among healthy plants. String-like strands of tough fungus growth will be found at the roots, and these will smell like mushroom. Mushroom-like growths appear from these in the autumn. The disease is spread rapidly by cultural operations and through spores liberated in the atmosphere.

Control: This is difficult, owing to the rapidity with which the mycelium of the fungus is spread by cultural implements. Where few infection centres are established, however, affected plants should be removed along with the neighbouring apparently healthy plants, and then the soil should be saturated with formalin 1 gallon in 40 gallons water. Little can be done where infection is general, and replanting in any such area is not recommended after removal of the plants.

Crown gall: This is a bacterial disease which affects the roots of the canes, causing a stunting and unthrifty appearance. The roots when examined have round, white, slightly-roughened knots on them, which turn brown and then decay. The bacteria usually enter the tissues through injuries caused by cultivating implements and are carried over in the soil.

Control: Dig up and burn infected plants. Do not take suckers for further plantings from a diseased plantation. Avoid injury to roots during cultivation as much as possible.

Septoria rubri causes leaf spotting, and should the infection become serious, heavy defoliation may occur in the late summer.

Control: Bordeaux mixture (3-4-50) in February and again in late March.

Seasonal Prevention

The foregoing are the main pests and diseases affecting raspberries. If the following seasonal measures are adopted and properly carried out, satisfactory control should be obtained:—

1. Endeavour to maintain clean cultural conditions at all times.
2. Spray at "bud movement" in the spring with Bordeaux mixture (5-4-50), plus lead arsenate (powder) at the rate of 2lb. per 100 gallons of spray. (To make 4 gallons of spray the quantities of the respective ingredients are: Bluestone 6½oz., hydrated lime 5oz., lead arsenate (powder) 1¼oz.)
3. Spray just before blossoming with Bordeaux mixture (3-4-50), plus lead arsenate (powder) at the rate of 2lb. per 100 gallons of spray. (To make 4 gallons of spray the quantities of the respective ingredients are: Bluestone 4oz., hydrated lime 5oz., lead arsenate 1¼oz.)
4. At petal fall. Repeat spray application recommended in paragraph (3) above.
5. When crop has been harvested:—
   (a) Remove and burn all sickly and dead canes and plants.
   (b) Repeat spray application recommended in paragraph (3) above, and again in early February and late in March, and after pruning.

Growers of raspberries are urged to utilise the officers of the Horticulture Division in the district, should symptoms of disease appear with which they are not familiar. The object of this service is to locate serious diseases as early as possible, and to acquaint the grower of the detrimental effects of these diseases so that he may combat them more intelligently and prevent the great losses which might otherwise occur.

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Radio Broadcasts

RADIO talks to farmers will be given from Station 1YA, Auckland, at 7.15 p.m. on the following dates:—

July 2—"Work on the Farm for the Coming Month," by Mr. E. B. Glanville, Acting Fields Superintendent, Fields Division, Department of Agriculture, Auckland, and Mr. P. S. Syme, Instructor in Agriculture, Department of Agriculture, Warkworth.

July 9—"Review of Methods Adopted in Field Experiments," by Mr. A. G. Elliott, Crop Experimentalist, Department of Agriculture, Wellington.

July 16—"The Work of the Animal Research Station at Ruakura," by Dr. C. P. McMeekan, Superintendent, Animal Research Station, Ruakura.

July 23—"Young Farmers' Club Session," to be arranged by the Waikato District Committee.

July 30—"Swine Husbandry," by Mr. H. R. Denize, Principal Inspector, Livestock Division, Department of Agriculture, Auckland.

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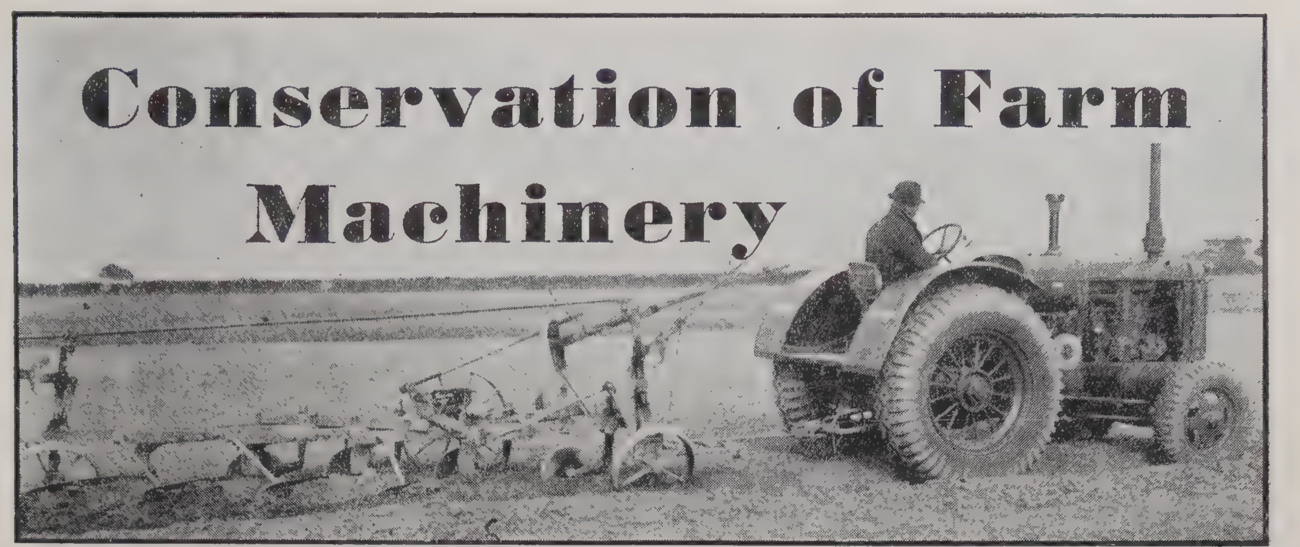
Conservation of Farm Machinery



Tractor Overhaul

The winter months provide a number of slack periods when the farm mechanic or tractor driver can carry out such maintenance jobs on the tractor as decarbonising and re-grinding in the valves. An elaborate workshop is not required. A weather-proof building, a bench, a vice, and the type of tool kit a conscientious operator will have are quite sufficient for the majority of maintenance jobs.

Dismantling

IT is essential to keep all internal parts clean and free from dirt. If the workshop has no clean concrete floor, place the various components, as they are taken from the tractor, on a clean bench. Nuts, bolts and small units should be placed in boxes or tins so that there is no risk of their being knocked off the bench and lost. If the tractor has an overhead tank, this will have to be removed first. Remove any components necessary to give free access to valves and head, such as the carburettor, manifolding, air cleaner, fan, etc. Remove the sparking plugs and drain the radiator. Slacken off and remove the cylinder head, taking care not to damage the gasket. See whether the tops of any of the pistons are very wet with oil; if they are it is a sign of excessive oil consumption and an expert should be consulted.

Marking Valves: See if the valves are numbered, and if they are not proceed as follows:—With the valve on its seating, centre-pock each valve head with a number of light dots corresponding to its position in the cylinder block, marking the valve nearest the front of the engine number one. (The last valve need not be marked). It is most important to see that each valve is on its seating before it is marked. Turn the engine over until one valve in a particular cylinder is at its maximum lift; then mark the other valve lightly. If a hammer and centre-punch are used on the head of a valve which is off its seating there is a risk of the stem being bent.

Removing Valves: Take off the valve cover and remove the valves in the following way:—

Make sure each valve in turn is on its seat, compress the valve spring (with a suitable compressor two screwdrivers or a thin wide-jawed spanner may do in an emergency) and remove the cotters very carefully, making sure that they cannot fall down into the sump or on to the floor and be lost. Remove the valves and examine each one to see that the face is not burned or damaged. A valve with a much burned or damaged face cannot be ground in satisfactorily and must be replaced with a new one. Next remove the valve spring, taking care that the collar does not fly off and get lost.

Decarbonising

Scrape all the carbon from the cylinder head, tops of the pistons, cylinder block, and the inside of the valve ports. The valves should be cleaned of carbon and the stems polished with very fine emery cloth. This should be done by rubbing up and down the stem parallel to its axis, or, in other words, in the same direction as the stem works in the guide (see Fig. 1). Valve stems should **never** be polished by drawing the emery cloth across the length of the stem.

To clean out the valve guides use the valves belonging to them. Dip the stems in petrol and work them vigorously up and down in the guides, removing, wiping, and repeating the process until the stems come out of the guides clean. On no account use a round file to clean out the guides.

Grinding in the Valves: Before grinding in each valve, place it in its own guide and turn the engine until the piston of the particular cylinder is at the top of the compression stroke and check that there is a clearance between the end of the valve and the top of the tappet (see Fig. 2). It is useless trying to grind in a valve to its seat if the tappet is holding it off its seating.

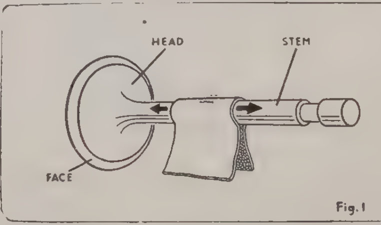
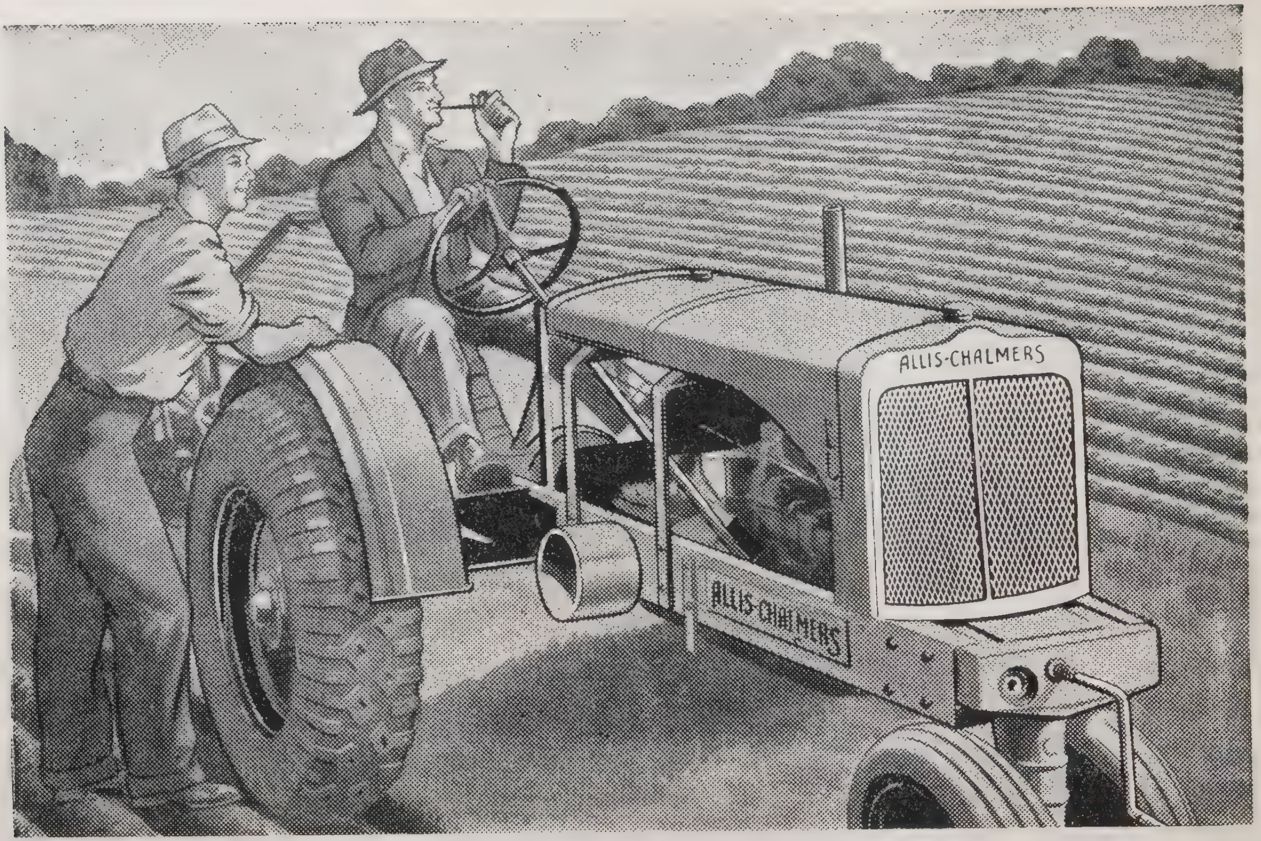


Fig. 1

You will need a tool which will fit firmly on to the valve head for grinding in. This may be a "fork" if the head has two holes in it, a screwdriver if it has a slot, or a suction valve grinding tool for plain valve heads. The latter is the most useful as it will fit any type of valve (see Fig. 2). Smear a very **little coarse** grinding paste on the face of the valve, then grind it in with a backwards and forwards motion, lifting the valve and giving a quarter turn to a fresh position at frequent inter-



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vals until an even and continuous seating is obtained on both the valve and the seat. Finish off each valve by wiping away all the coarse grinding paste and substituting some fine to give the finished surface. Valve grinding can be made a lot easier if a suitable size of spring is threaded over the valve stem before placing it in the guide. This will push the head of the valve off its seating whenever the pressure is released from the screwdriver or other tool being used to grind it in (see Fig. 2).

When the grinding in is completed wash each valve, seat, and guide with petrol to remove all traces of grinding paste.

Valve Springs: The valve springs should be checked by standing them all in a line upon a flat surface and seeing that all of them are of the same length. If any are short they must be replaced with new ones.

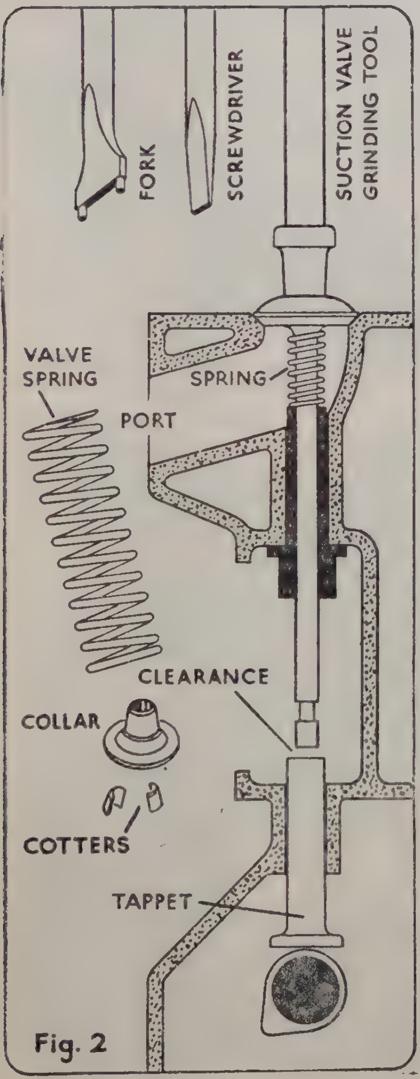

Fig. 2

Re-assembling

Replacing Valves: Make sure that the tappet is down before trying to replace a valve. Smear each valve stem with oil, put it back into its correct guide, fit the spring and collar, and compress the spring. The cotters should be smeared with thick grease, such as water pump grease, so that they will stay in place on the valve stem until the spring tension is released. When the cotters are in position on the valve stem release the spring slowly, making sure that the collar "beds down" properly on the cotters.

Tappet Adjustment: When the valves are replaced adjust the clearance between the stem and tappet, or rocker arm in the case of an "overhead valve" engine (see Fig. 3), according to the makers' instruction book, making sure whether the tappet clearances mentioned are for a hot or cold engine. Use a feeler-gauge, held lightly, to set the gap. It should slide through the clearance with just a "sticky" feeling of resistance; do not try to force it through. Where no adjustable tappet is provided (as in Fig. 2) the valve stem must be ground on the end, to give the correct clearance.

Cylinder Head Gasket: Cylinder head gaskets should not be used more than twice or three times at the most. Examine the old gasket and replace with a new one if it shows any signs of damage. Used gaskets should be cleaned very carefully with a blunt knife. **Never use jointing compound on any cylinder head gasket;** a smear of thick grease on both sides is all that is needed.

Cylinder Head: Replace the gasket and cylinder head. The bolts or nuts should be replaced finger-tight at first, and then tightened, a little at a time in turn, starting at the middle and working outwards (as in Fig. 4). Never tighten one nut or bolt completely, leaving the others loose; always tighten evenly. This method should be adopted whenever two components are held together by a series of nuts or bolts. Failure to comply with this method will result in distortion and probably fracture of the part.

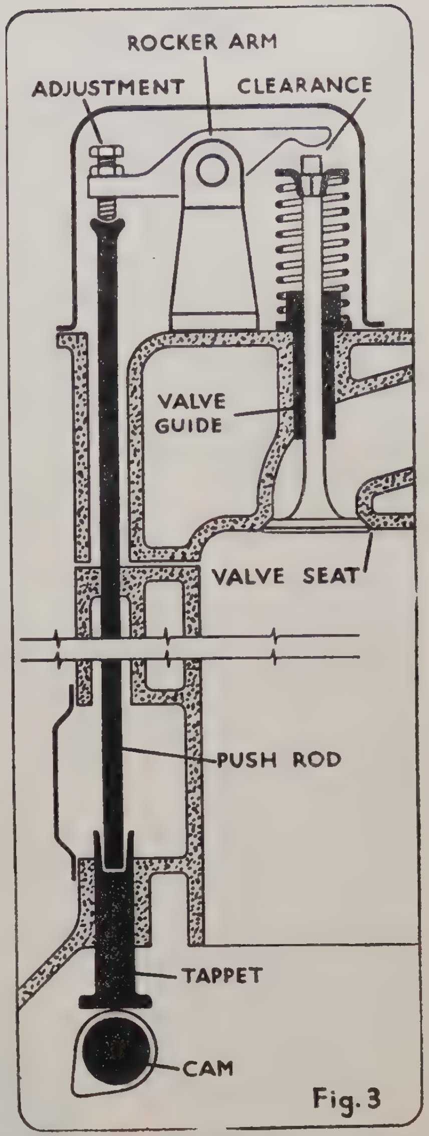

Fig. 3

Next replace the manifold, taking care to see that a sound joint is made

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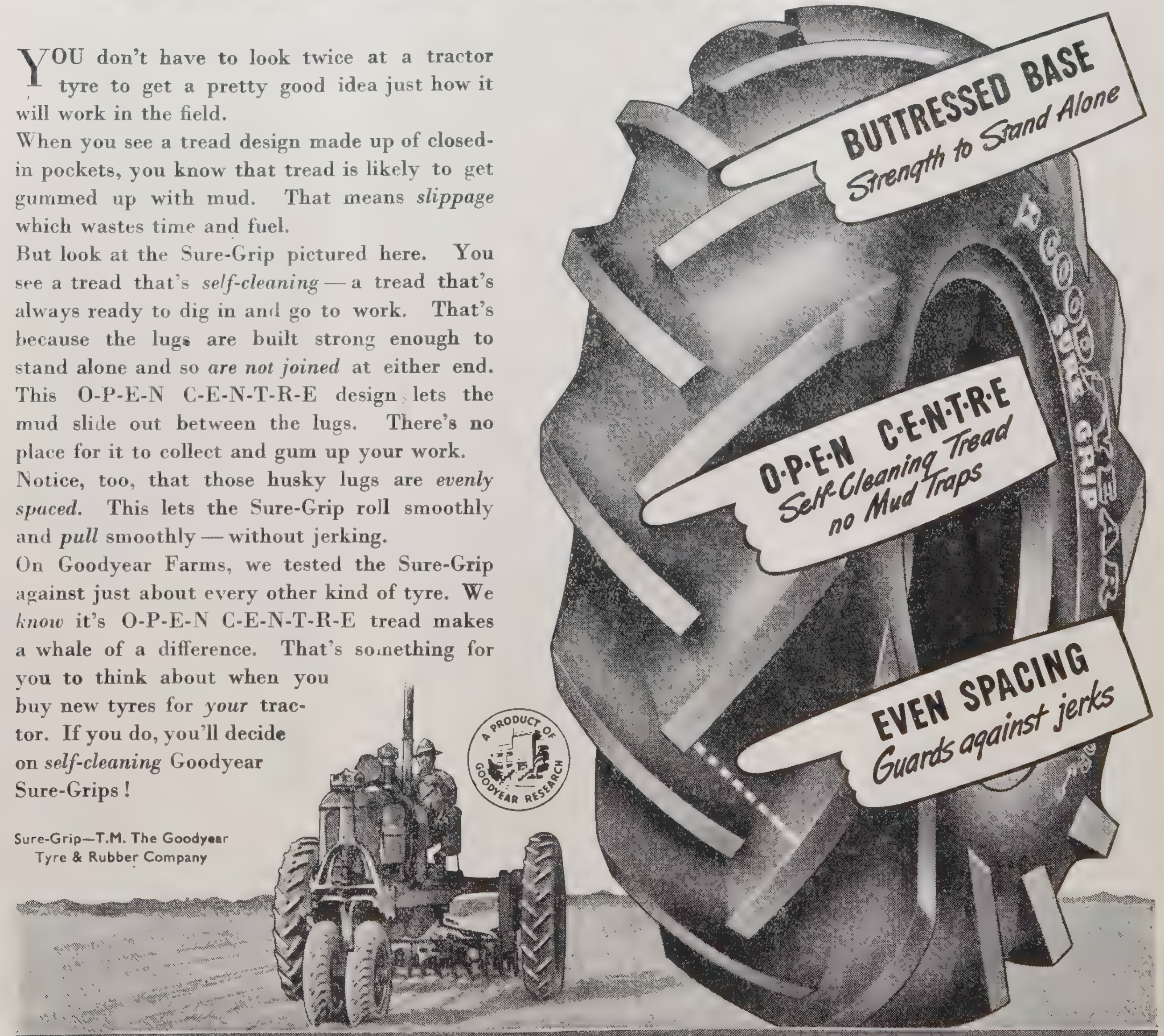
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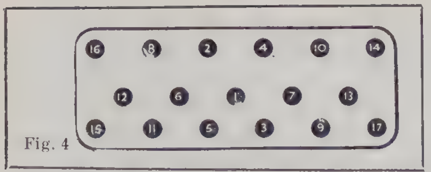

Fig. 4

with the cylinder block. A defective gasket at this point can cause an air leak which will upset the running of the engine. Finally replace the other components such as air cleaner, oil filter, fan, tank, etc.

Sparking Plugs: Plugs should be cleaned and gaps set to makers' figure. Always adjust the plug point gap by moving the electrode attached to the body of the plug; **never attempt to bend the centre insulated electrode**, or damage to the insulation may result. If the points of a plug are very burned or if the insulation is damaged, replace it with a new one. Find out the correct type of plug for your tractor from the instruction book and use this type only. When replacing the plugs see that the high-tension leads are in good condition. If the insulation is very much damaged or broken, fit a new lead. Small breaks can be repaired with insulating tape.

Magneto Points: Examine the contact breaker points on the magneto. If they are badly pitted, they should be replaced. Slight roughness can be removed with the finest file obtainable or a worn piece of emery cloth. **Both contact surfaces must be square and dead flat.** Finally set the gap between the points to the figure given in the makers' instruction book. To do this remove the sparking plugs, turn the engine over very slowly with the starting handle until the impulse starter just "clicks"; then turn the engine backwards by hand (using the fan belt) until the contact breaker points are fully open. Set the gap with the feeler-gauge at this point (see Fig. 5).

Tightening Down

Start the engine and warm it up to normal working temperature. Stop it, and tighten down the cylinder head and manifold again, in the same order as before.

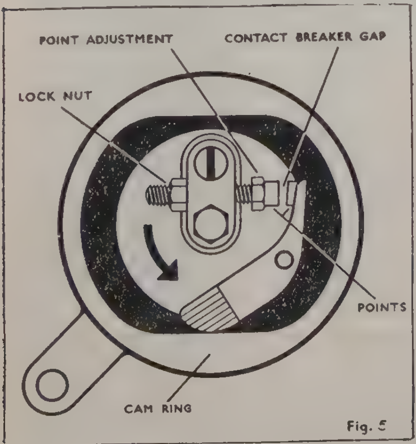

Fig. 5

Checking Over

During an overhaul the whole tractor should receive a general checking over. The following are the main points that should be examined:—

Fan and Water Pump: See that the fan bearings and water pump spindle are not worn. If water is leaking from the pump gland, make sure that the correct type of grease is being used there, and that the packing is in good order. If very little packing is left replace it with a new one.

Fan and Dynamo Belts: These should be adjusted to the correct tension and not replaced with new ones, if still intact, until no further adjustment is left. They should not be "drum" tight, nor able to be depressed more than three-quarters of an inch at a point midway between the pulleys (see Fig. 6).

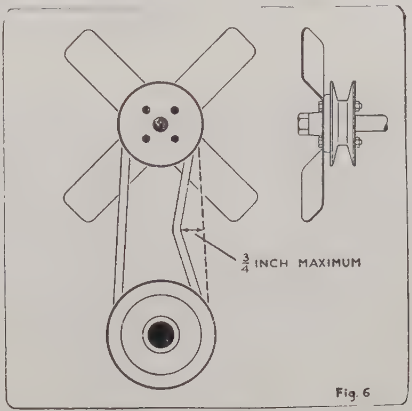

Fig. 6

On some makes of tractor the fan belt is tightened by removing shims from the fan pulley. This will make the belt run nearer the rim and so tighten it (see Fig. 7). It is important to see that the same number of shims is removed from each side of the pulley.

Spindles and Bearings: Try the steering to see if there is any slackness in the linkage, and examine the king pins for wear. To take up slackness at these points worn bearings and pins must be replaced. Finally see that no grease nipples are missing, damaged, or blocked.

Fuel Line Unions, Taps and Sediment-bowls: Clean all fuel filters and go over the fuel lines for leaks. Tighten or repack leaking unions and replace damaged taps. See that the cork gasket in a glass sediment-bowl is intact and any sealing washers in metal bowls undamaged. If trouble has been experienced in the past through dirt in the fuel, empty the fuel tank, clean it out, and filter all fuel before refilling.

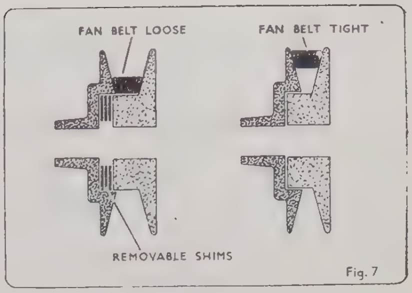

Fig. 7

Sump: Drain the sump and clean or replace the oil filter elements. If you wish to flush out the sump use a proper flushing oil; **never use paraffin**. Make sure that the gauze in the oil filter is clean and undamaged, and use it whenever oil is put into the engine.

Radiator and Air Cleaner: Flush out the radiator with plenty of water before refilling. Drain the air cleaner, making sure that there is no sediment in the bottom, and refill it with the correct grade of oil.

Finally, do not interfere with the carburettor or magneto (except to adjust the contact points on the latter) as these require expert knowledge.

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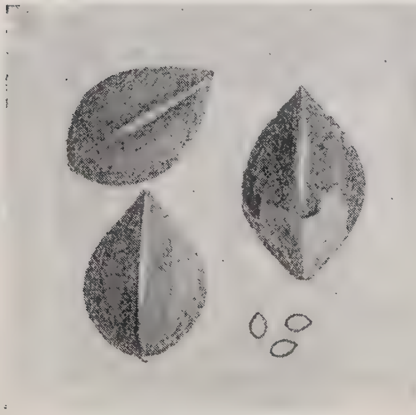
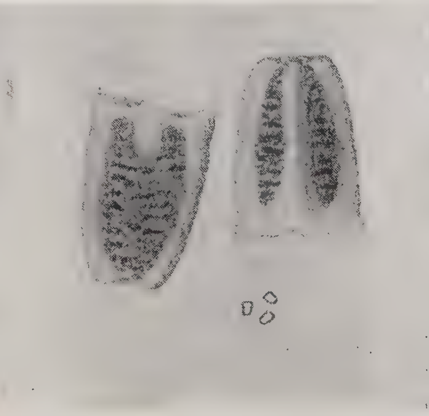
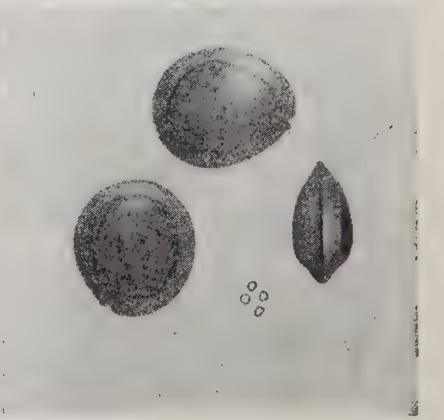
The first and second series of illustrated weed seeds appeared in the January and May issues respectively of the "Journal."



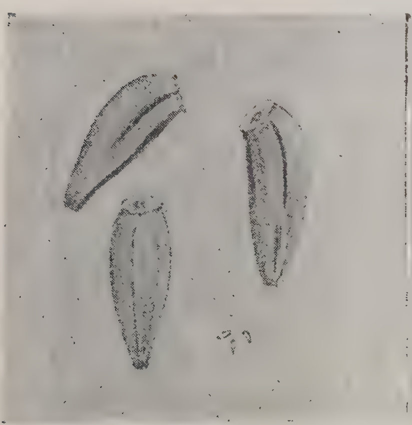
POLYGONUM CONVOLVULUS: CORNBIND OR BLACK BINDWEED. Colour black. Occurs frequently in wheat, barley, and oats. An annual weed with turning stems, especially troublesome in cereal crops.



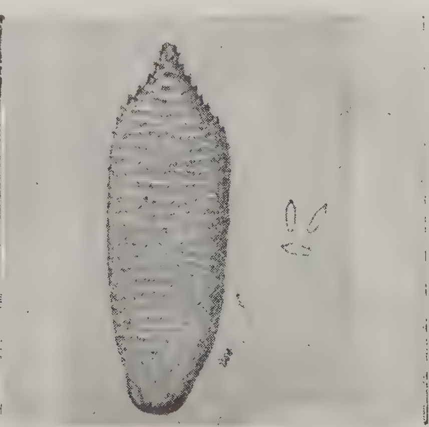
MATRICARIA DISCOIDIA: RAYLESS CHAMOMILE OR RAYLESS MAYWEED. Colour white to grey, streaked with brown. Occurs rarely in *Lotus major* and white clover. Australia admits not more than 10 seeds per ounce. An annual weed found mainly in the North Island.



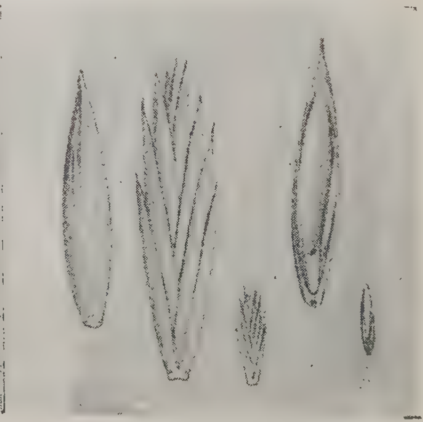
AMARANTHUS RETROFLEXUS: RED-ROOT OR PIGWEED. Colour dark brown to black. Occurs with medium frequency in white clover. An annual weed troublesome on cultivated land in the North Island.



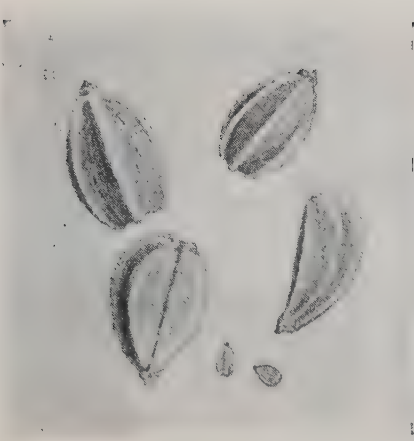
MATRICARIA INODORA: SCENTLESS MAYWEED OR SCENTLESS CHAMOMILE. Colour brown to black, with white ribs. Occurs with medium frequency in white clover and crested dogstail. Australia admits not more than 10 seeds per ounce. An annual weed growing in dry pasture-land.



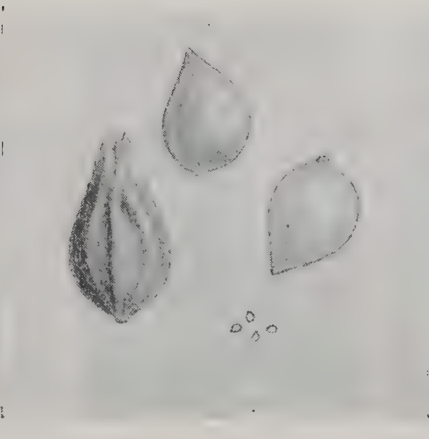
HELMINTHIA ECHIOIDES (Picris echioides): OX-TONGUE. Colour reddish-brown. Occurs with medium frequency in cocksfoot and ryegrass. Australia admits not more than 20 seeds per ounce. An annual or biennial weed of rough pastures and wasteland.



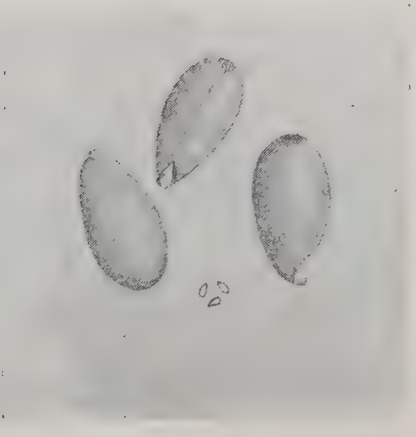
AGROPYRUM REPENS: COUCH GRASS. Straw coloured. An occasional impurity in cocksfoot seed. Classed as a noxious weed seed in the United States, and as a primary noxious weed seed in Canada. A perennial grass with underground stems which make it difficult to eradicate. A serious weed in arable land.



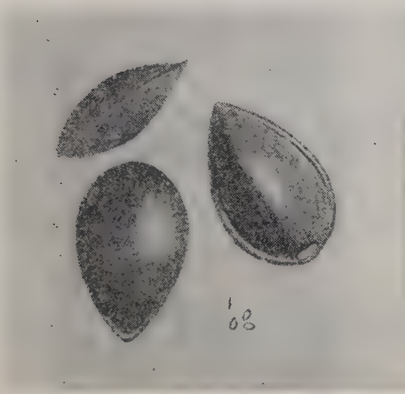
CONIUM MACULATUM: HEMLOCK. Colour grey. Occurs rarely in red clover and ryegrass. Australia prohibits importation. A poisonous biennial weed.



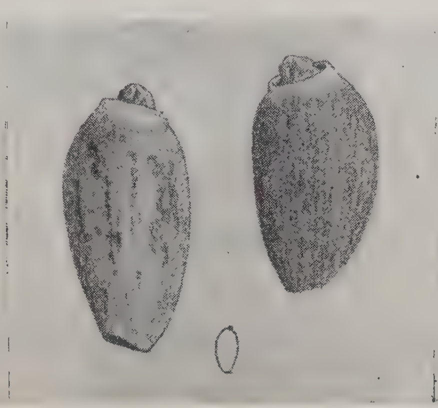
ALCHEMILLA ARVENSIS: PARSLEY PIERT. Colour pale yellow to grey. Occurs in white clover. An annual weed of dry pasture-land.



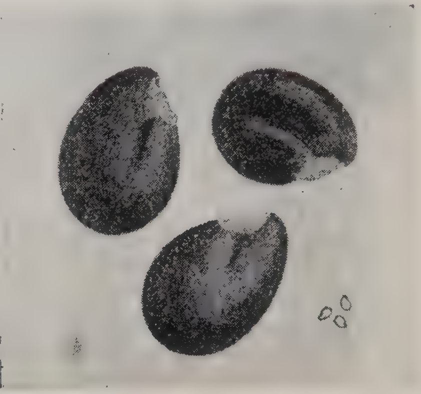
VIOLA TRICOLOR: FIELD PANSY. Colour yellow to brown. Occurs rather rarely in white clover seed. An annual weed of no importance.



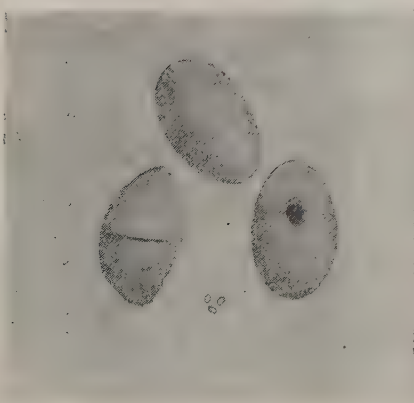
MYOSOTIS ARVENSIS: FIELD FORGET-ME-NOT. Colour dark brown to black; surface glossy. Occurs with medium frequency in white clover. A biennial weed of little importance.



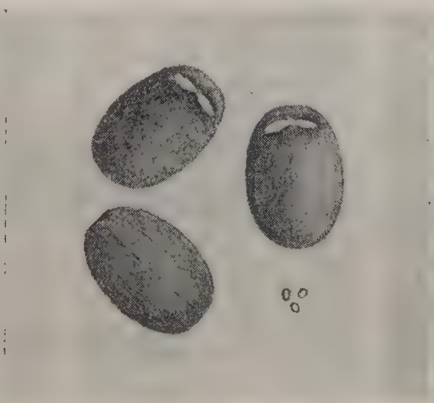
SILYBUM MARIANUM: MILK THISTLE OR VARIEGATED THISTLE. Colour variously marked grey and black. Occurs frequently in oats and barley imported from Australia. An annual or biennial weed of pasture-land.



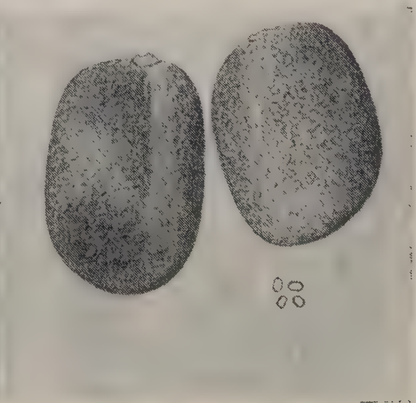
RESEDA LUTEA: CUT-LEAVED MIGNONETTE. Colour black. Occurs rarely in white clover. Often found in oats and barley. Imported from Australia. An unimportant weed.



PLANTAGO CORONOPUS: BUCK'S HORN PLANTAIN. Colour grey to brown. Occurs rather rarely in white clover and creeping bent. An annual weed abundant in some coastal districts.



NEPETA CATARIA: CATMINT. Colour brown. Found occasionally in white clover and *Lotus major.* An unimportant perennial weed.



BARBAREA VERNA: WINTER CRESS. A common impurity in red clover and white clover. In Canada classed as a secondary noxious weed seed. A biennial weed.

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FOOT-ROT IN SHEEP

By

H. DOYLE,

M.R.C.V.S.,

Veterinarian,

Hamilton.

Precautionary Measures Necessary

AT this period of the year foot-rot is one of the most troublesome and widespread diseases affecting sheep, especially those on wet, marshy land. On the dry, harder country the horn of the feet is naturally worn down and the hooves are not allowed to become overgrown, as is the case where the pastures are soft and damp.

FOOT-ROT may be divided into two types—(1) contagious, (2) non-contagious. As both these conditions have, from a practical viewpoint, more or less the same predisposing causes, symptoms, and treatment, difficulty will be experienced by the farmer in differentiating between contagious and non-contagious. Therefore it is intended in this article to consider all cases as of the contagious type.

Wet seasons and damp, low-lying pastures have a detrimental effect on the feet of sheep kept for any length of time on them. The horn structure of the hoof becomes weakened by the excessive moisture, and heavy dews on pasture may have a similar effect in causing softening and even decay of the horn.

Common Causes

Most farmers are aware that one of the most common predisposing causes of foot-rot in sheep is injury or abrasion of the tissues in the space between the claws, producing the condition known as "scald." This may be brought about by the irritation produced by long, rank pastures, and under muddy conditions grit and dirt may become lodged in the interdigital space and so produce small wounds in this area. "Scald" is usually regarded as the precursor of foot-rot.

In areas where irrigation of pastures has been introduced the condition of foot-rot has become much more prevalent than was formerly experienced.

In cases where the hooves of sheep are allowed to become overgrown, with the formation of long toes, an uneven treading surface is produced and the pressure is unevenly distributed on the ground surface. This encourages the formation of cracks and separations between the wall of the hoof and the sole, allowing the entrance of dirt contaminated with bacteria.

Seasonal Conditions

Seasonal conditions, such as rainfall with a strong growth of pastures, must have an important bearing on the incidence of the disease. Merinos and half-bred sheep seem to be more susceptible to foot-rot than the British breeds of sheep, and Romneys are generally considered to be less susceptible than the average breed.

The above-mentioned conditions all tend to bring about a state of affairs in the foot which may result in the non-contagious type of foot-rot, but if the pastures on which the sheep are grazing are contaminated by the organisms responsible for the contagious type the weakened state of the feet renders the sheep very susceptible to infection by these organisms, and so the contagious variety is set up.

It is true that foot-rot is a specific contagious disease, and that before new cases can develop under natural conditions material from foot-rot cases must come in contact with the feet of the sheep. It will readily be appreciated that in flocks where some sheep are affected the pastures become temporarily contaminated, and that mud through which affected sheep have been moved is a ready source of infection. Soft, wet conditions such as sometimes exist around gateways or dirty yards are means by which sheep may develop foot-rot.

Causal Agent

While the organism *Fusiformis necrophorous*, which is responsible for the death of tissue, is generally associated with foot-rot in sheep, and was widely held to be either alone, or in conjunction with other organisms, the cause of the disease, research by Beveridge in Australia indicates that the causal agent is a different organism, which he at present has named "K."

It is thought that the organism *Spirochaeta penortha* is perhaps also necessary for the development of the typical disease. *F. necrophorous* may also play a part; it is perhaps a secondary invader commonly present in the environments.

Although the incidence of foot-rot varies with the seasonal conditions—that is, fresh cases developing mostly in spring and autumn, when there is a flush of feed, and few new cases developing during summer—nevertheless fresh cases can develop only where infection is present.

The question which the farmer will naturally ask is, "When the disease has apparently died down during a dry season, where does the infection come from to start a fresh outbreak? Does it survive in the soil or on pastures and become active when conditions are favourable?"

Research would indicate that the organism in material from foot-rot cases does not survive for more than about three weeks in mud, etc., but in the lesions of chronically-infected sheep it may survive for at least

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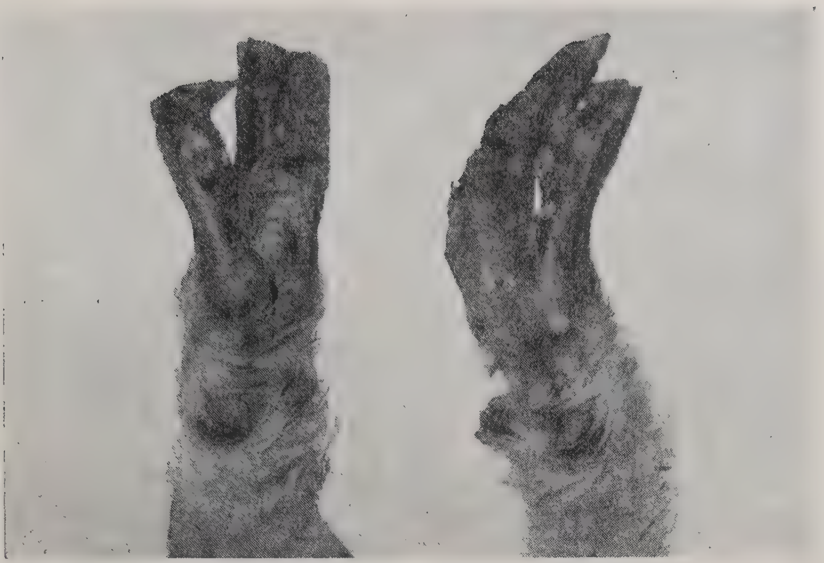

Because of the lack of wear and attention, especially when on wet, heavy ground, the hoof becomes overgrown and distorted, as shown.

three years and a half. From this it will be seen that the most likely place for the organism to survive from one outbreak to another is in the lesions of chronic cases, and cases of this kind become a source of infection for other sheep when favourable conditions again exist.

Symptoms

It is hardly necessary to go into detail with regard to the symptoms, as the sheep-farmer has become quite familiar with them through experience.

Probably the first symptom shown will be lameness, the degree varying with the stage of the disease. In the early stages slight lameness will be seen while in advanced cases the lameness will be more marked.

Where only the fore feet are badly affected the sheep will sometimes be seen on its knees while grazing; when all four feet are grossly affected the animal is not inclined to move about and lies in one place and grazes around it. Due to lack of wear, the hoof becomes overgrown and distorted.

The affected sheep rapidly lose flesh and become very weak in cases where the pain is great. All the different stages may be seen in one flock, from slight cases to advanced cases where the sheep cannot move about.

Presence of Lesions

Examination of the foot in the early stages shows inflammation, denoted by redness and swelling, in the space between the claws. The area appears moist and gives off an evil-smelling odour, while ulceration of the skin is often present.

Once established the disease extends rapidly, under-running the horn of the hoof and affecting the deeper structures of the foot. If a little pressure be brought to bear on the inside of the foot a slight dirty, evil-smelling discharge will be seen oozing from the edges of the horn.

Ligaments, tendons, or even bones of the foot may become involved. As the condition becomes chronic the hoof becomes detached from the underlying tissues in places, and in some cases the hoof may be shed.

Once established, the disease extends rapidly, under-running the horn of the hoof and affecting the deeper structures of the foot.

Steps for Control

If the sheep-farmer fully appreciates the contagious nature of this disease and takes proper steps in attempting to eradicate it from the flock, preventing as far as possible fresh infection, he will be amply repaid for his trouble.

The fact that it has been shown experimentally that the causal agent of foot-rot cannot survive apart from the sheep for more than a few weeks should prove extremely useful in forming a scheme of control.

Assuming that the organisms responsible for the disease will lose their infective powers if not in contact with sheep for a few weeks, pastures which are kept without sheep for one month can reasonably be taken as free from infection.

In attempting to minimise the incidence of foot-rot on a property the whole flock should be subjected to a thorough examination, and each sheep, whether showing symptoms of foot-rot or not, should be included in this examination.

"Hospital" Paddocks

Certain paddocks should be set aside as "hospital" paddocks, and every sheep which on examination shows any sign of foot-rot, whether it be in the very early stages or in the advanced stages, should be kept isolated in these "hospital" paddocks.

The apparently clean sheep—that is, those which show no external evidence of the disease — should be put through a foot-bath containing a solution of copper sulphate (bluestone) of the strength mentioned later. It is only after this precaution has been taken that these sheep should be put on to the pastures which have been spelled from sheep and are therefore regarded as clean.

The remainder of the flock — those sheep which are showing lesions of foot-rot in any stage—should be kept in the "hospital" paddocks, and, after a thorough paring of the feet, treated either individually or by means of the foot-bath, depending on the numbers affected and the extent of the lesions. Badly-affected sheep should be hand-dressed.

Proper Preparation

The fact that the feet of badly-affected sheep must be properly prepared before any dressing will have a beneficial effect cannot be too strongly emphasised. All diseased or loose horn must be carefully but thoroughly removed in order to provide drainage and also to expose the affected sensitive structures to the action of the dressing. Remember that the causal organisms develop best under crusts and dead tissue in the absence of air.

After the sheep have apparently recovered it will be good practice to keep them for a month before putting them on to the clean pastures with the sheep free from foot-rot. This precautionary measure is taken as sheep which have apparently recovered may carry infection, but if they continue without showing lesions for a month they are apparently free from infection.

If this control measure is carried out, the incidence of foot-rot should be reduced, if not eliminated from a flock. The fact that fresh infection may be carried mechanicaly from infested pastures to clean pastures by means of horses' feet or on the boots of workers must not be overlooked, but the chance of this happening is very remote.

Having reduced the incidence of the disease in a flock, care must be taken to isolate any new sheep and to treat any affected animals before they are introduced into the flock.

Methods of Treatment

On properties where foot-rot is prevalent the sheep-farmer is well advised to examine the feet of the sheep periodically, to trim off any overgrown horn, and to put the sheep through the foot-bath. Thorough trimming of the feet is absolutely essential in badly-affected animals. The dead tissue does not necessarily become detached of its own accord, so that this must be removed to allow any dressing to have effect. All under-run horn should be stripped. During the examination all misshapen hooves require paring to discover any possible hidden focci of infection.

Cases in the early stages may be treated by means of a foot-bath. The bath may be made of either wood or concrete, about 16ft. long, 10in. wide, and 7in. high at the sides, and 3in. at the ends. Side fences are provided, close-boarded and sloping outwards, to permit the sheep to walk through. A thin layer of wool may be laid on the floor of the trough to prevent splashing.

Various preparations have from time to time been used in the foot-bath, but probably copper sulphate (bluestone) or formalin solution gives as good results as any.

Solution of Bluestone

The bluestone for use in the bath should be of 10 per cent. solution when used as a safeguard against foot-rot, and 20 per cent. in treatment (20 per cent. equals 1¾lb. of bluestone to 1 gallon of water).

The sheep should be put through the bluestone bath at least once a month, and should be held in the foot-bath for three to five minutes. There is no necessity to put more solution into the

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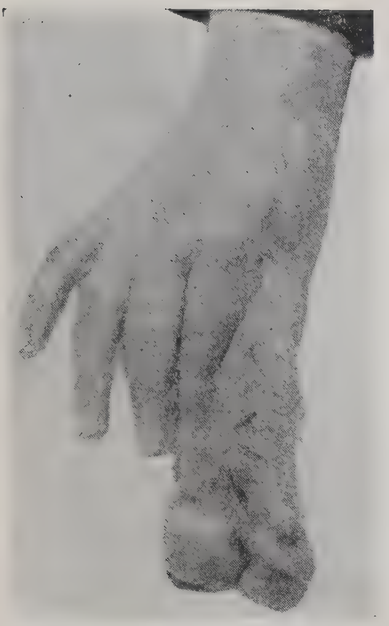
Internal Parasites

Much concern is felt in farming circles because of the serious annual losses among sheep and calves due to the ravages of internal parasites. A bulletin has been prepared to cover all aspects of this problem, including short descriptions of the various common parasites encountered, and a summary of the methods of treatment available to the farmer. This bulletin, No. 171, is obtainable **free** from the Department of Agriculture at Auckland, Wellington, Christchurch, and Dunedin.



Showing affection of the heel and sole of the foot.

bath than will be sufficient to cover the feet of the sheep.

Formalin solution has given good results both as a foot-bath and also for individual dressing. For use in the bath a solution of 1 part of formalin to 15 parts of water should be prepared, the sheep being kept in the solution for ten minutes and then held on the battens until quite dry.

Hand Dressing

In hand dressing individual cases after careful and thorough paring of the feet, a solution of 1 part of formalin to 3 parts of water is applied, and the sheep should be kept on the battens until quite dry. It is a good practice in hand dressing advanced cases to keep them for several days on the battens, providing them with dry feed. This allows the feet to be kept dry and gives the dressing a more prolonged action. Hand dressing should be carried out daily.

Arsenical preparations are sometimes used in the treatment of foot-rot, but it is questionable whether the treatment is any more beneficial than bluestone or formalin, which are comparatively safe and easy to use. Arsenic is poisonous, and every precaution should be taken to guard against the possibility of ingestion of the arsenic by stock.

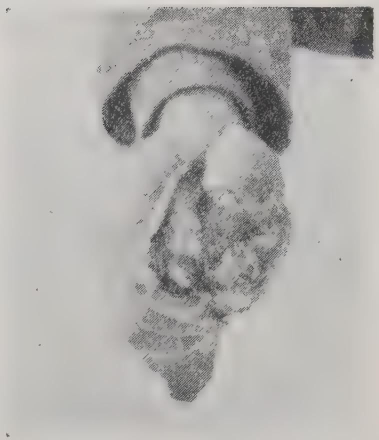
Where a poisonous bath such as arsenic is used it is necessary to provide a yard for drying in order to prevent deaths from the consumption of pastures contaminated with the poison. Various proprietary preparations for the treatment of foot-rot are on the market, and, if properly used according to instructions, will no doubt give satisfactory results.

Use of Ointments

In advanced cases it will be necessary to hand dress. Ointments are useful in hand dressing badly-affected cases because of their prolonged action. A useful dressing may be made up as follows: Over a slow fire mix one part of powdered bluestone, one part of lard, and two parts of stockholm tar.

It is important that the foot should be thoroughly dry before the ointment is applied. The number of applications will vary with the intensity of the lesions; bad cases should be dressed two or three times a week.

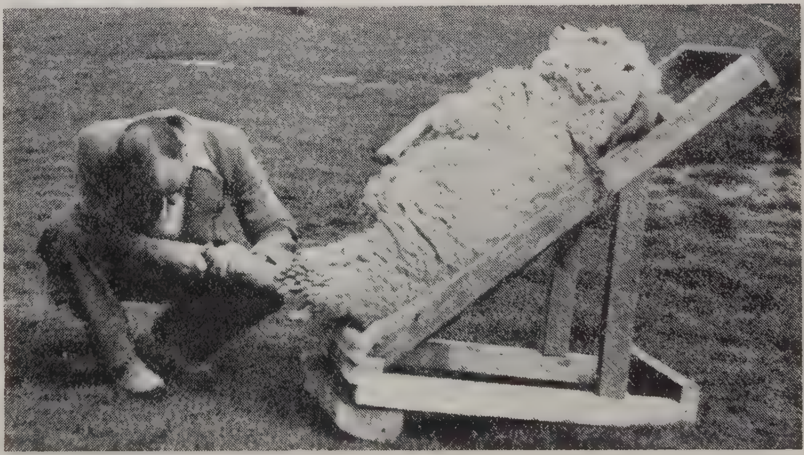
Butter of antimony is sometimes used in hand dressing foot-rot cases.



A deformed hoof after shedding extensive overgrowth.

As a general application it is much too caustic in its action, and should never be used as such. It is useful only for applications to areas of granulation tissue or proud flesh, and then its application must be controlled by applying it with a feather or a very small brush.

"Chair" for Treating Foot-rot



THE thorough paring of affected feet, which is so essential in treating foot-rot, will be more easily carried out, particularly when working single-handed, if a chair similar to the one illustrated is used. This chair is in use on the farm of Mr. L. Baker, Rissington, Hawke's Bay. It can be simply constructed from old timber (3 x 2 or 3 x 4½) and sacking. The sheep is secured by a leather strap across the neck, fixed on one side of the frame and fitting on to a hook on the other.

Rough dimensions for use with Romneys are:—

Base: 2ft. 6in. long, 1ft. 6in. across.

Uprights: 1ft. 8in. high.

The sacking "bed" should, of course, be sufficiently long and broad to dip, forming a trough into which the back of the sheep fits.

—A. D. M. G. LAING, Veterinarian, Hastings.

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BEAN PRODUCTION

GOOD results have been obtained with runner beans "Fardinlosa" at the Services Vegetable Production Project, Hamilton, during this season.

The seeds were sown on November 1, 1944, in double rows, 7in. between rows and 35in. between each pair of rows as follows:—

```
        O                                        O
| 7″ | 35″ | 7″ | 35″ | 7″ | 35″ | 7″ | 35″ | 7″ | 35″ | 7″ |
   1    O     2          3          4    O     5          6
```

Substantial end posts were erected at the ends of the rows in positions O between pair rows 1 and 2 and 4 and 5 and a wire strained at a height of 4ft. 8in. from the ground and supported by light posts at intervals of $\frac{1}{2}$ chain placed along the rows. Stakes were then placed between pair rows Nos. 1 and 2 and Nos. 4 and 5 as shown in Fig. 1. These stakes were spaced 14in. to 15in. apart and tied to the wire. The intervening row No. 3 was dwarfed by pinching out the tips of the main runners, while row 6 was allowed to climb up stakes 4ft. 6in. high.

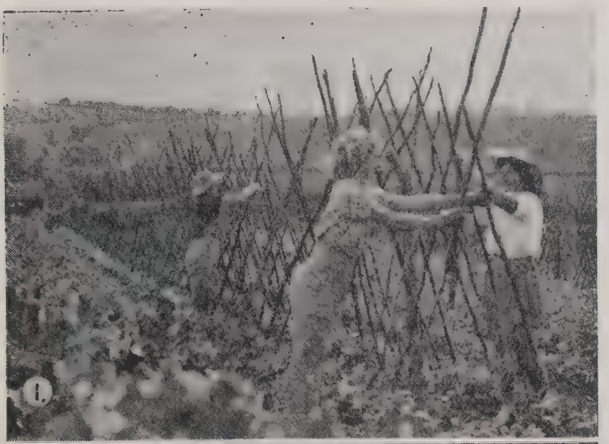
Fig. 2 shows the growth made by Nos. 1 and 2 and 4 and 5 pair rows up the stakes and also the appearance of No. 3 pair row (dwarfed). Fig. 3 shows pair row No. 6 in the centre of the tall rows where beans were allowed to climb the single row of short stakes and were then pinched when the runners had reached the full height of the stakes. The beans were ready to pick at this stage. Fig. 4 shows the first picking. Fig. 5 shows how prolific this bean is and also its size and quality. The first picking was made on February 5.

Lime at $\frac{1}{2}$ ton per acre was broadcast, followed by 5cwt. per acre of bonedust, broadcast and thoroughly disced in. Superphosphate at $2\frac{1}{2}$cwt. per acre was drilled in with the seed.

Thorough cultivation was carried out with a horse hoe until the beans commenced to run, when the stakes were erected. No cultivation was done after trellising was put up.

The quality of the beans harvested from the dwarfed rows was not to be compared with the produce from the trellised rows. A large percentage of the former were very curled and twisted and unattractive on the market, while those produced from the trellises were a good, even sample as illustrated in Fig. 5.

—*T. E. RODDA, Fields Instructor, Hamilton.*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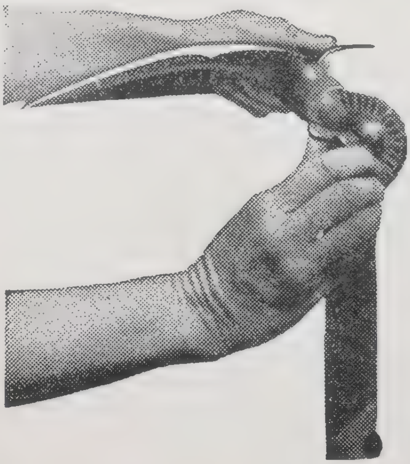

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Honey Extracting and Packing House

MANY commercial apiarists starting with a few hives have built a small honey house at first and have built on as the apiaries have been expanded until the building gave sufficient floor space to meet their total requirements. The resultant building under these conditions has not always been pleasing to the eye, neither does it always give the best utility of space.

A BUILDING may, however, be built a portion at a time if working off a plan of the proposed completed structure. While in the process of building up his hives the beekeeper may elect to erect either the motor shed or the workshop, then later the extracting room and finally the packing room and office. The site chosen for the building illustrated should be a level section reasonably accessible, and in full view of a road or highway.

The building illustrated is designed to meet the minimum requirements of a 400-hive establishment.

Specifications

Brief specifications for the construction are as follows:—

Materials: Concrete and timber.

Foundation: Concrete blocks extending up to carry the sleepers, or, as an alternative, concrete foundation to 3in. above ground level with sole plates and studs up to the sleepers.

Sleepers: 4in. x 3in. building heart timber.

Joists: 5in. x 2in. building heart timber.

Bottom plates: 4in. x 2in. building heart timber.

Framing: 4in. x 2in. ordinary building timber.

Purlins: 3in. x 2in. ordinary building timber.

Flooring: 6in. x 1in. t. and g. heart timber.

Outside walls: 6in. x 1in. bevelled-back weatherboards, 6in. x 1in. facings with scribing pieces.

Roofing: Cover main roof with corrugated asbestos board or corrugated galvanised iron. Flash parapet, windows, and doors with galvanised flat iron.

Flat roof over porch: Galvanised flat iron or waterproof roofing. Inside walls and ceiling of extracting room, packing room, office, and porch to be covered with suitable wood pulp insulating board. Fix a 6in. x 1in. skirting board to all walls, with windows and doors where shown on plan.

Extracting and packing room: One each 3-light window with 54in. x 22in. sashes.

Office, packing room, and workshop: 4 single-light windows with 42in. x 22in. sashes.

Porch: One 3-light fixed sash 54in. x 62in.

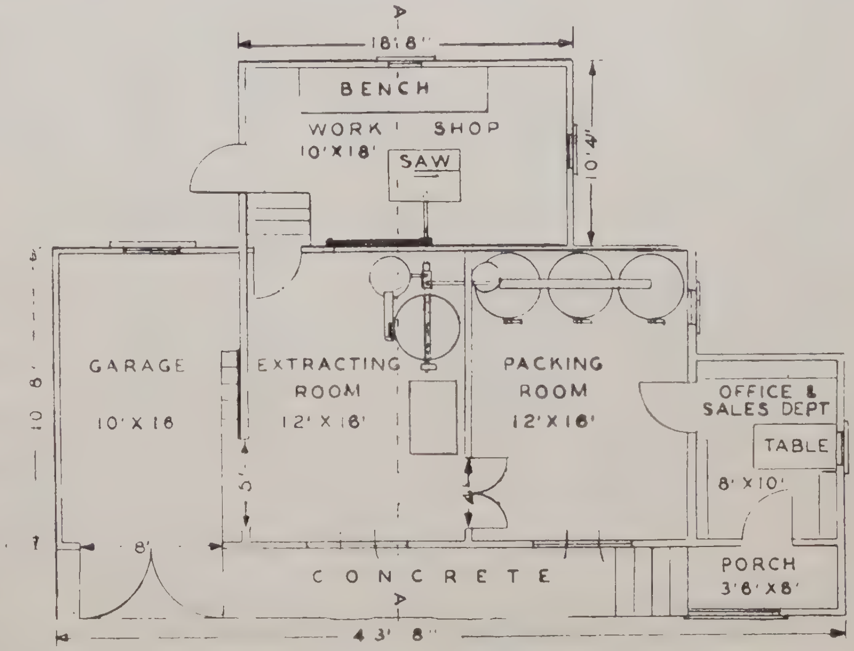
Motor shed: 1 single-light window with a 24in. x 36in. top-hung sash. Paint the whole of the exterior walls, the interior walls, and ceilings, except motor shed and workshop, with three coats of white lead and oil paint.

Lighting: Provide an electric lighting point for each room and one for the porch, also one power point in the workshop, extracting room, and packing room.

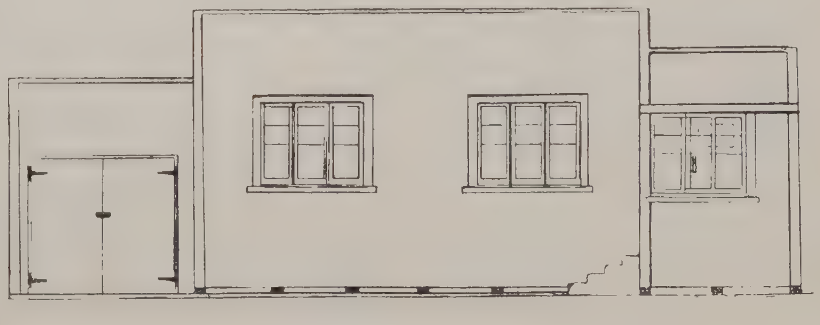
Layout of Plant

The layout is so arranged that a truck-load of honey can be driven straight in to the motor shed and the door closed to prevent robbing.

Supers of honey can then be moved either by trolley or a modified warehouse barrow on to the floor of the extracting room close to the capping melter, thus eliminating the lifting of heavy supers. The supers of extracted combs can then be stacked



PLAN OF HONEY HOUSE



FRONT ELEVATION

on the floor near the wall of the motor shed out of the way, thus avoiding any unnecessary moving of supers to give working space.

The plant is powered by a 1-horse electric motor located under the floor. Power is transmitted by belts from the motor to pulleys on a counter-shaft and then to pulleys on the extractor, pump, and saw bench.

A level floor is very convenient to work, but its success depends on an efficient honey pump to elevate the honey into the tanks. It is advisable to run the honey from the extractor into a small tank (recessed into the floor), which will regulate the fluctuating flow from the extractor and give an even flow through the pump. In addition to this, it will allow particles of wax to rise to the surface for skimming off. The pump, which should be connected to the tank near the bottom, will then pump the honey into the tanks in the packing room.

Packing room: Tanks of a capacity to hold one ton of honey each 2ft. 10in. x 3ft. 6in. diameter are a suitable size, and should be set on a platform at least 20in. from the floor to allow space under the honey gate for a 60lb. tin to be set on a platform scales.

Tins and cases may be stored in the packing room, where the walls and ceiling are covered with insulating board, which helps to keep the room warm and dry.

Storage: It would require the entire floor space of both the extracting and packing rooms to accommodate all empty supers of combs during the winter months.

Workshop: Every beekeeper will find this a necessity. A circular saw for hive making will greatly reduce the establishment costs of hives. As shown on the plan the saw can be driven from the counter-shaft.

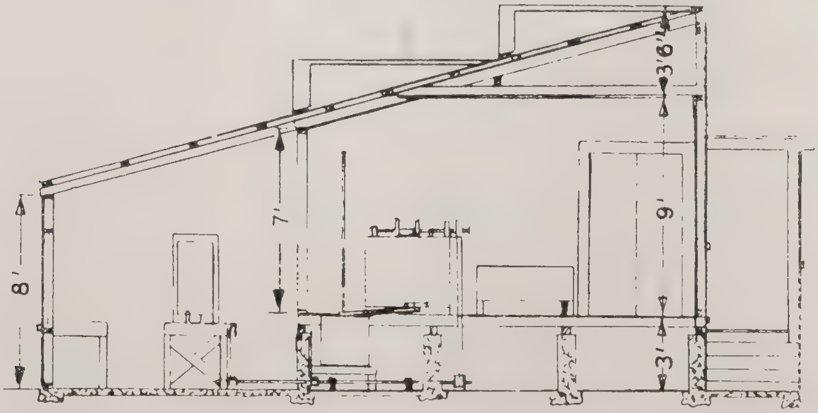
A bench on which to make apiary equipment is essential.

Office and sales department: Under present conditions the majority of beekeepers sell honey direct to consumers at the honey house. Therefore more thought should be given to this aspect of the business when planning both the site and the conditions under which a valuable foodstuff is housed and offered for sale. Provision is made in the plan for a suitable office and sales room at the main entrance to the building. This room should be well finished, with the walls, ceiling, and shelves painted a light cream tint, and should be kept clean and tidy at all times.

Both doors could be of the modern flush type with chromium fittings, and architraves, skirting, table, and doors should be varnished. Ample shelving should be provided for tins and cartons.

A honey house and plant arranged in this way enable the beekeeper to organise his work efficiently, and also to attend to private sales of honey in attractive surroundings, where the customer will have no opportunity to interrupt extracting and packing operations at busy periods of the season when time is an all-important factor to the beekeeper.

—*L. H. JOHNSON, Apiary Instructor, Palmerston North.*



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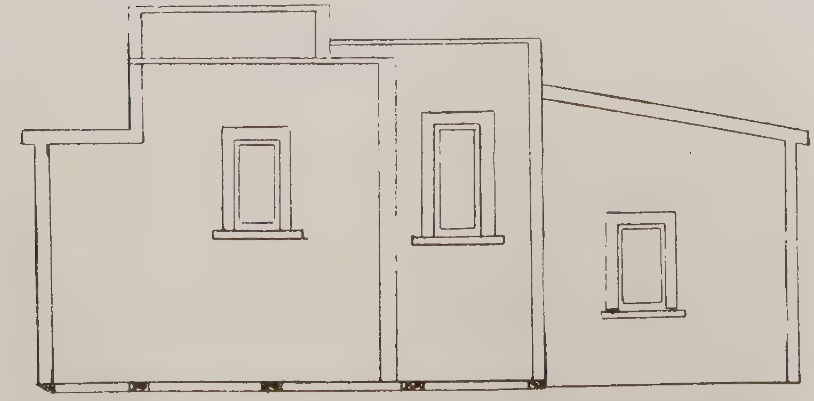

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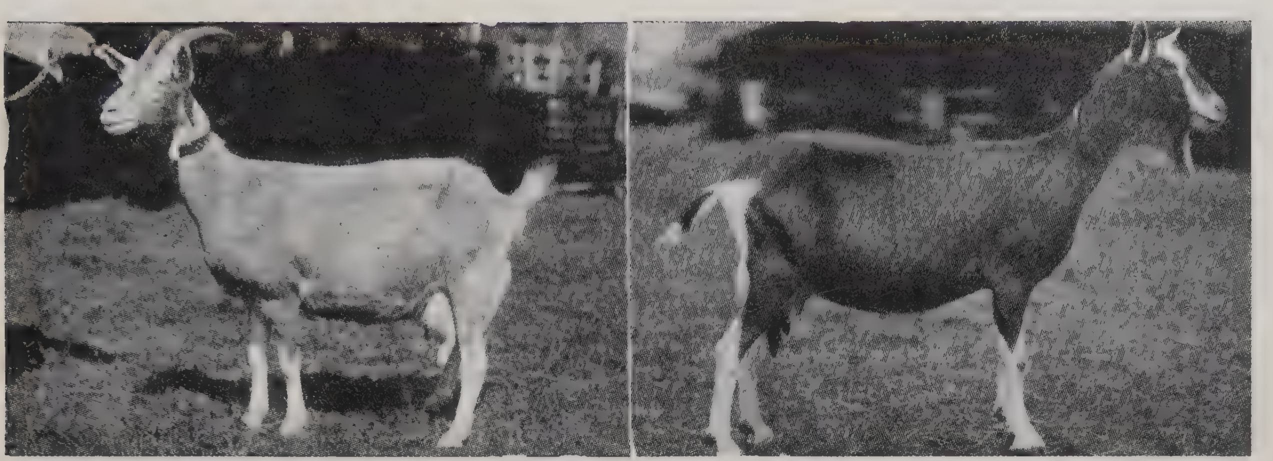
Milking Goats and Their Care



Left.—British Toggenburg nanny whose milk yield for one year was over a ton. Right.—Anglo-Nubian-Swiss nanny.

ALL nanny goats, after having their kids, will give milk, in the same way that cows will "come in." The quantity of milk given is largely determined by two factors: First, whether the goat is of a milking type—i.e., Toggenburg, Saanen, Nubian, Anglo-Nubian, British Alpine, etc.; second, her food and general care given by her owner.

By

H. A. SAVAGE,
Waiomio Native School,
Kawa Kawa.

IN New Zealand there are few, if any, goats of a pure, undiluted, well-bred milking strain. Importations are somewhat rare, and owners of good animals are loath to part with any good milkers. Good goats are not particularly easy to get. Goats of average yield are more common, and the owner who looks after his animal will find he gets well repaid for his trouble and cost of feed.

It should ever be borne in mind that the goat is not, naturally, a straight-out grass eater, but is herbivorous, and thrives best on a variety. Leaves, twigs, bark, shrubs, etc., appeal most. Plain grass seems to be a second choice. A supply of shrubs is a little beyond the means of the urban goat-keeper, but hedge clippings—privet, arbelia, acacia, hakea, willow (a favourite)—may be occasionally obtained; hay also will be readily eaten summer and winter.

It seems decidedly advisable to tie all hay or clippings in a bundle, hung up where the goat can reach them, rather than throw them down in a heap for the animal to fossick through or pull about looking for a titbit, thus treading on and wasting the food. Goats are fastidious and decline to eat soiled food.

Hard Food for More Milk

The feeding of grain, etc., is well worth the slight cost. Experience has proved over and over again that a ration of grain, given at milking times for preference, will increase milk yield at least 40 per cent. and as high as 60 per cent., and more if the right combinations are found. Crushed oats are best, though dearest. Crushed maize is nearly as good and much cheaper. Whole maize can also be given, but care is needed as to quantity and size of grain, or else indigestion results. Wheat and barley will be eaten readily—even "scratch food" for poultry, being a mixture, is relished. Bran is splendid, but unprocurable at present; barleymeal and stockfood are good substitutes.

Be sure to feed these **dry**. Unless a goat has been trained since infancy to eat mashes an adult goat will not touch a mash. Put the bran or meal in a dish dry and the goat will make short work of it. Put about three or four handfuls per feed. If feeding grain as well, give her three or four of these in a **separate** pile in the same dish, or separately on a board, or in another dish. Do not mix. Goats have preferences and begin blowing food out of the dish, nosing it through, or pawing it to get at their favourite.

Goats like a change of ration and this can be easily arranged. Be sure to give the goat water. Contrary to a popular myth, goats will drink water in hot weather and, when milking, water is imperative. A goat giving eight pints daily must have water to supply fluid. This is obvious, but it is surprising how many people think goats do not drink. Goats, when milking, usually drink after their feed of dry rations. The writer has seen a goat giving seven pints daily drink nearly a gallon of water, after consuming a feed of bran and oats. Change the water frequently if the water supply is a pail. In winter, of course, little or no water is taken unless the goat is milking.

Goats need salt for digestion, so be sure to have a lump of rock salt available or a patent salt lick.

Tethering

A dog collar and rope about 20ft. long are quite good for tethering. Goats need exercise, and the longer the rope the better. A swivel is needed—a calf swivel would do to

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prevent the rope twisting. Hammer a stake into the ground and fix a loop at the rope's end so it can revolve freely. Another method with a shorter rope is to tie it to a log or block that cannot be moved by the goat but can be easily dragged to fresh pasture by the goat-keeper. The best method of all if the space is sufficient and there are no goat-proof fences, is a long wire between two fixed objects (posts); the goat's tether is attached to a sliding ring on the wire.

Running free in a paddock is the perfect method, but goat-proof fencing is hard to erect with present shortages. Goats can get under, through, or over any ordinary fence, and will make a beeline for the flower garden or orchard.

Feet

Goats' feet grow constantly, and goats running on soft ground need their feet trimmed about every three or four months. Wet soil brings on softening and distintegration of the hoof. Give your goat a box or board to stand on in wet weather. A pile of rocks is better and helps to keep their feet worn down. Some rough concrete is splendid.

Coat

If run down in condition goats occasionally get lice. Light oil or insect powder will dispose of them. An occasional brush is helpful.

General

With feeding at 1s 9d to 2s a week and a little care, a goat should milk at least four months and give enough to keep a household of two adults and two children with milk puddings in the flush of the milking season. A good milker is usually long-necked, a good steady feeder and good water drinker, and docile. A big udder is not an indication of a good milker. The writer's best milker, which for two weeks was milked three times daily, had a small udder.

Do not give too much dry feed—bran, oats, etc.—after kidding in an effort to increase milk production by feeding high protein content food. Abscesses on the udder are likely to occur.

Try your goat with different foods; you'll be surprised at what they will eat—dry stale bread (wholemeal), honeysuckle, convolvulus, and all sorts of trailing vines. Fruit they enjoy, but apples and acid fruits are liable to cause them to dry off. If possible, give your goat some shelter. Goats dislike rain and will often make for a shelter at first drops.

Remember the milk is a by-product of the animal after its bodily demands are satisfied. The less demands on the food for body maintenance, the more nourishment is available for turning into milk.

Remember, also, that goats are intelligent, docile, and friendly. Goat's milk is very nourishing and well suited for infants. The mineral constituents more closely approximate that of human milk, and the iron, phosphorus, and calcium compounds are in a less complex and more easily assimilable form, hence are very easily digested.

Goats appear to be immune to tuberculosis and mammitis, and their milk is pure and uncontaminated. Moreover, the flavours of what they feed on do not pass over into the milk.

Experience has shown that babies not thriving on cow's milk have sometimes shown a remarkable change and steady improvement when put on to goat's milk.

Goats sometimes get scours in spring and autumn if the feed is too rank or luxuriant. Give hay for a day or two and do not be alarmed if the goat fasts. Two or three days or less should see her back to normal. Too much bran will also cause scours.

◆

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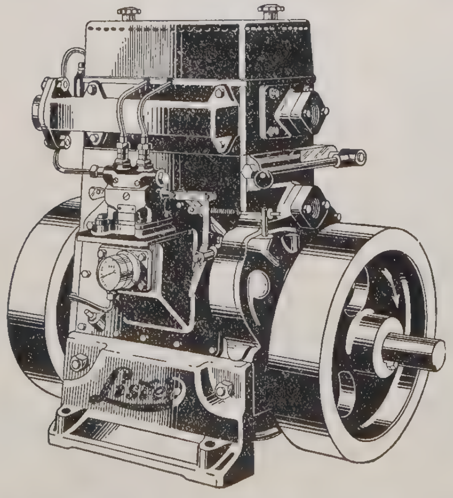

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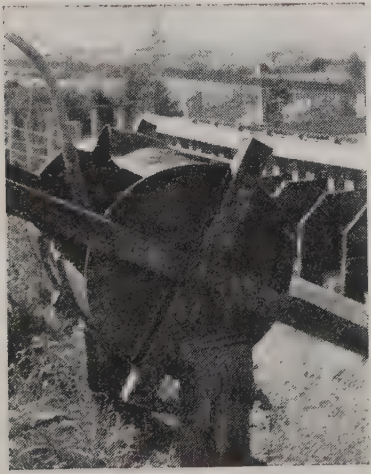
Feeding Skim Milk the Easy Way

Feeding the skim-milk is apt to be a bothersome and messy job when done the hard way, but a Northland farmer, Mr. R. McKay, of Taipuha, has shown that with a little ingenuity the job can be made both simple and clean. Moreover, as the chief essentials—a few pieces of 4in. by 2in. timber and an old drum—are usually available on a farm, the cost is negligible.

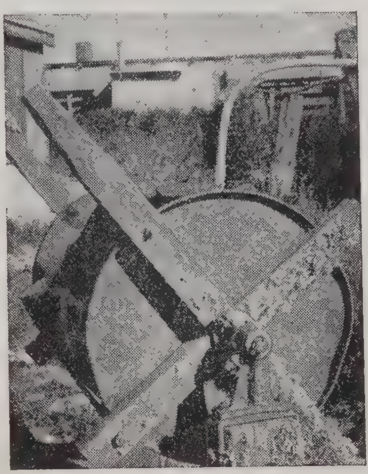
As shown in the illustrations, the receptacle he has contrived for the milk is an ordinary 40-gallon drum, opened from end to end, and having one side of the opening hammered out to form a convenient spout for pouring. The drum is held in a cradle constructed with 4in. x 2in. crossbars held in position by three iron screw-bolts. The handles of the crosspieces are simply bolted to the ends of the drum.

As will also be seen, the whole outfit is pivoted on two short axles, mounted in bearings on two wooden posts set into the ground. If it were preferred, the axles could be engaged into bearings cut direct into the posts.

The drum is shown below with the opening under the skim-milk pipe so arranged that it will overflow when about half filled. The drum is held in position by means of a few links of chain fastened to the post and engaging with a hook at the bottom of the cross bar. The holding capacity of the drum can thus be adjusted according to whichever link is engaged with the hook. It will be noticed that the outfit is conveniently placed alongside the feeding bails.



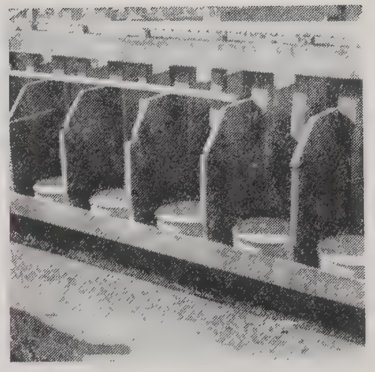
View of container in filling position.



Showing container being revolved into position for pouring into bucket.

Easy Adjustment

When operating the outfit, Mr. McKay adjusts the chain so that the drum will hold just the amount of skim-milk required. Since the opening is visible from the shed, he can judge by the froth on the milk when it is about to overflow, and shut off the supply. When feeding the milk, the drum is revolved by the cross-bar handle, so that the milk flows evenly through the spout into the feeding bucket.



View of calf-feeding bail, showing how each bail is partitioned off from its neighbour. Mr. McKay has found this to be much superior to the usual pattern. As will be seen, the bail bars are simply operated by a length of chain. Note, also, the special galvanised troughs used for feeding.

Considering that it can be so easily and conveniently emptied to the last drop, and can be cheaply constructed by any handy man, this ingenious device is obviously well worth a place on the farm.

—*P. S. SYME, Instructor in Agriculture, Warkworth.*

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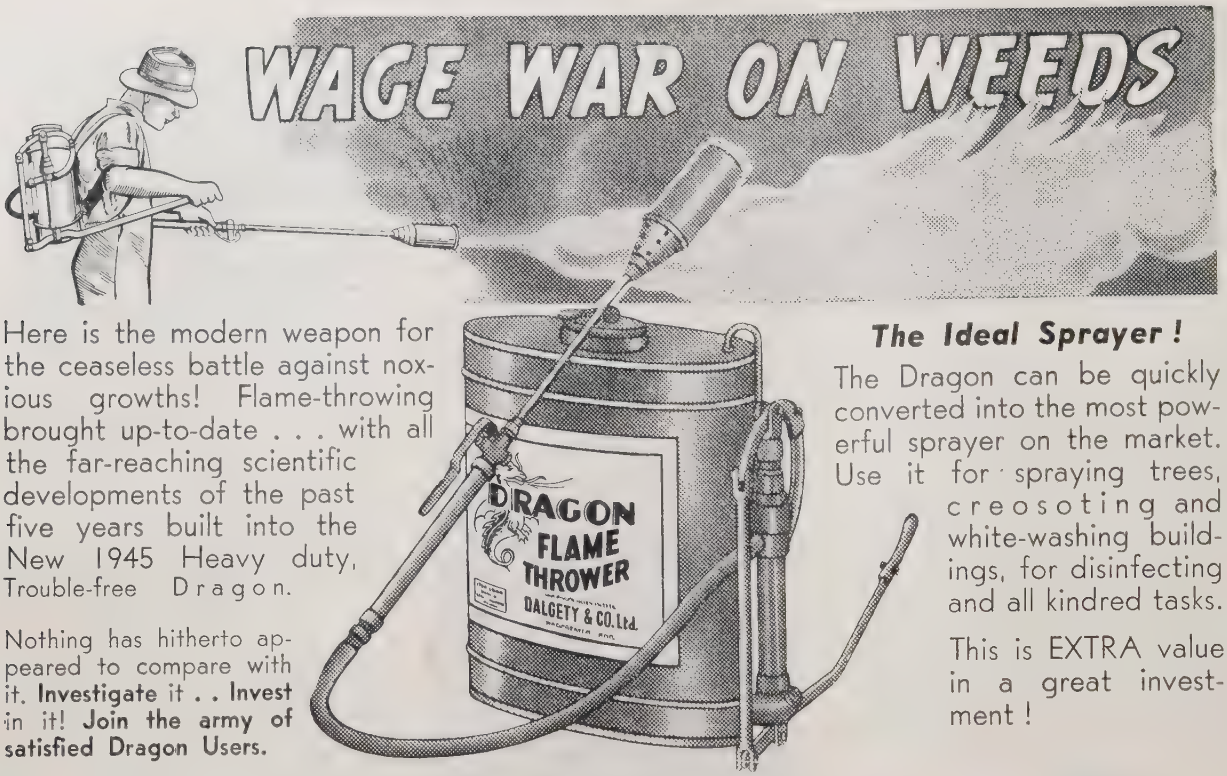

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VETERINARY NOTES

Colic in Horses

THE horse is more subject to colic than any other domestic animal, because of the small size of the stomach in the horse and the impossibility of vomition in that animal.

The term "colic" is usually accepted as indicating abdominal pain. This may be due to a variety of causes, but the most common form in horses is usually the result of digestive disturbances, caused as a rule by unsuitable or defective food or irregularity in proper feeding. The causes of colic can be summarised as follows:

1. Overfeeding. This is intensified if the fodder is one which is difficult to digest.
2. Sudden change of food, such as is seen in horses suddenly changed from grass feeding to chaff, oats, and hay.
3. Working the horse immediately after feeding.
4. Mouldy or musty fodder.
5. Allowing access to drinking water soon after feeding. This is especially dangerous in horses unaccustomed to it.
6. Horses with weak digestion are frequently the subject of colic.
7. A sudden lowering of the temperature of the surface of the body in cold, wet weather.
8. Drinking very cold water.
9. The consumption of frosted roots.

The most common forms of colic are (1) flatulent, (2) spasmodic.

Flatulent colic is usually the result of eating food which tends to give rise to rapid fermentation. The most outstanding symptom is distension of the abdomen by gas. Evidence of pain is shown by general uneasiness, pawing with the fore feet, or kicking at belly with the hind feet. The horse lies down and rises again quickly. Sweating in patches might be observed.

Spasmodic colic is accompanied by spasm of muscular wall of the bowel, during which the horse may throw himself violently and roll as the result of acute pain.

Prevention of colic in horses must be along the lines of avoidance of those irregularities of feeding which predispose to an attack.

Treatment of severe cases calls for immediate assistance by a veterinarian. As a first-aid measure a drench composed of 1oz. of chloral hydrate dissolved in 1 pint of water and shaken up with 1 pint of linseed oil will be found useful. In cases of "windy" colic, 1oz. of oil of turpentine can be added to this drench.

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Red Worms in Horses

OF the internal parasites affecting horses, probably the one which causes most concern among breeders is that known as the red worm. Although horses of all ages may harbour this parasite, the condition produced by gross infestation is much more serious in young horses.

Means of Infection

In order to exercise control measures over this condition, one must have some idea of the means by which young horses become infested.

The mature worm, which inhabits the large bowel of the horse, lays eggs which pass out in the droppings. Provided the conditions of temperature and moisture are suitable, these eggs hatch, and small worms emerge, but further development is necessary before these worms are capable of infesting other horses. The time taken to reach the infective stage varies from a few days to weeks.

The infective larvae, as the worms are named at this stage, gain entrance to the bowel by being taken up in the food or drinking water. From the bowel they enter the blood-stream, where they occasionally cause trouble by becoming lodged in certain blood vessels and causing aneurisms, colic, and perhaps death of the host. On leaving the blood-stream the larvae again enter the digestive system, where they develop into mature worms in the large bowel.

Symptoms

Symptoms exhibited vary with the number of the parasites present. Young horses which are heavily infested become very unthrifty, and the coat is dry and rough. As the disease develops or persists, the affected animals gradually lose condition, becom-

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2 You continue to use "luxury lights"—Porch Lanterns, Hall Lights, etc.

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3 You use more than one light to illuminate a room when one will do the job.

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4 You do your ironing in "dribs and drabs" over two or three days.

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5 You use two elements for cooking when one will do.

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6 You are careless in the use of Toasters, Radiators, Radios, forgetting the need for conservation of power.

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ing weak and anaemic. In some cases diarrhoea is present.

A less frequent symptom, but one which is occasionally shown, is that of colic, the abdominal pain resulting from larvae becoming lodged in the blood vessels supplying the bowel. Some obscure forms of hind-leg lameness may be traced to the effects of the larvae in the arteries carrying blood to the hind limbs.

Treatment

Medicinal treatment has an effect only on the mature worms in the bowel, and has no action on those in the immature stage, which are distributed in other parts of the body. However, beneficial effects may be obtained by expelling as many of the adult worms as possible.

A commonly-used drench for infested horses was that composed of 2oz. of vegetable turpentine well mixed up in a pint of raw linseed oil. As this drench was difficult to administer to young, untrained horses in particular, many owners preferred any other means to cope with the trouble. Owners would be well advised to consult their veterinary surgeon in regard to other medicinal agents to be used against the worms. Many of the drugs available are of a poisonous nature, and, if not given under veterinary supervision, dangerous results may be brought about. The comparatively new preparation known as phenothiazine comes within this category, and although very effective for red worms in horses, some care is necessary when the dosing of weak and anaemic horses is undertaken. As it is important to build up resistance and condition in young infected horses, good feeding should form part of the treatment. When the horses have been on good feed, such as chaff and crushed oats, for a few weeks, a dose of phenothiazine may be administered to each animal in its feed. It should be given only where horses are fed individually, so that the dosage can be regulated. Horses readily take the drug in their chaff or mash, either added in the form of powder or wetted and mixed in the mash. From ½oz. to 1oz. may be given to each animal, according to its size and age. In the case of anaemic animals the drug has proved toxic, according to reports from overseas, so that it is a wise precaution to use it under veterinary supervision. The drug should not be repeated in the same loose manner as other worm preparations are commonly used by stock owners. Repeated dosage is liable to accentuate the toxic tendency of the drug; otherwise, if used under veterinary supervision, phenothiazine is a valuable agent against red worms. It is not effective against bots in horses.

Control

On farms where trouble is experienced from the effects of red worms gross contamination of the pastures should be prevented as far as possible. The risk of heavy infestation may be minimised by keeping young horses off paddocks which have been mainly used for other horses. Naturally the foals must run with their mothers up to weaning time, but if clean cow pastures are then available, combined with some supplementary feeding, the foal should experience a minimum of trouble from red worms. The larvae reach the infective stage on the pastures, and the pastures may remain infective for about 12 months. Prolonged grazing of the same pastures with horses will intensify the danger in the same way as overstocking of pastures intensifies the worm numbers carried on the pasture. Rotational grazing of young, susceptible stock, if possible on clean, worm-free pastures, together with suitable clean supplementary feeding, are the measures most designed to prevent gross infestation with red worms.

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Answers to Correspondents

Trouble in Rearing Pups

"G.W.W.," Cambridge:

I have trouble in rearing pups. As soon as they commence to lap they become infested with knots of worms about four inches long and round. They become very low in condition, often lose the use of their legs, and appear distressed in many ways.

Would you be good enough to tell me how to prevent them from getting infested in the first place, and also how to cure them when they are infested.

LIVESTOCK DIVISION:

It is evident that your pups are infected with ascarid worms. The adult worms are found in the small bowel, and eggs laid by them are passed in the droppings of the dog. Under favourable conditions the eggs develop and reach the infective stage in a minimum period of 5 days. Eggs are very resistant to drying and freezing, but hot, dry conditions with direct sunlight will kill them in a few weeks.

Dogs become infected by picking up the eggs with food or water, or, in the case of sucking pups, from the soiled skin of the mother. When swallowed the eggs hatch in the intestine and the resultant larvae burrow into the wall of the gut. Some of these may be swept off into the blood stream, so that pups may be infected before they are born. The majority crawl back into the lumen of the gut and reach the adult stage 8 to 9 weeks after first being swallowed. They themselves then begin laying eggs.

To prevent infection, therefore, it is necessary to treat bitches soon after mating and keep them in clean surroundings. Treat again about 6 weeks later, then immediately before whelping wash along the udder and place in clean quarters. Dogs should not be allowed to eat off ground which may be infected.

The most effective and safe drug is tetrachlorethylene given in a gelatin capsule, at the rate of 0.2 c.c. for each kilogram weight of the dog. This is also safe for puppies. If you gave the weight of each dog to your chemist, he would prescribe the drug for you from the above information.

◆

Faulty Castration of Sheep

"I.J.H.," Dannevirke:—

Could you please advise me of the best method of castrating rig sheep. Owing to having used ineffective emasculators, I find myself with quite a few rigs (2-tooths).

LIVESTOCK DIVISION:—

You describe your sheep incorrectly as rigs, since the word rig, or cryptorchid, is used to describe an animal in which one or both testicles are retained in the belly cavity and do not descend into the purse at birth.

Probably the best way to deal with such sheep is to castrate with the knife as you would a bull calf, by making a vertical incision in the purse over the testicle, releasing this from its covering, and, to prevent bleeding, either scrape the cord or "string" through with up and down movement of the edge of the knife, or tightly ligature the string well up with a piece of strong sterilised linen thread, before cutting it through, say, ¼ in. below ligature. There is a certain amount of risk of infection, so care should be taken to have hands clean and instruments sterilised. Put animals in a clean paddock immediately after operating. There is some risk of fly strike also, and either wounds should be well dusted with boracic powder and sheep kept under daily observation until healing occurs, or the operation should be delayed till colder weather.

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Pig Industry Broadcasts

UNDER the auspices of District Pig Councils broadcasts will be delivered in July as follows:—

Auckland.—1YA, on July 18, at 7.15 p.m., "Bacon Production," by H. E. Clark, Supervisor, Auckland District Pig Council.

Wellington.—2YA, on July 17, at 7.15 p.m., "Care of Pigs in Summertime," by C. H. M. Sorensen, Supervisor, Taranaki District Pig Council.

Christchurch.—3YA, on July 19, at 7.15 p.m., "Answers to Questions," by H. McIntosh, Supervisor, Canterbury District Pig Council.

Napier.—2YH, on July 12, at 7.15 p.m., "Processing Pigs at the Freezing Works," by I. H. Owtram, Supervisor, Tairawhiti District Pig Council.

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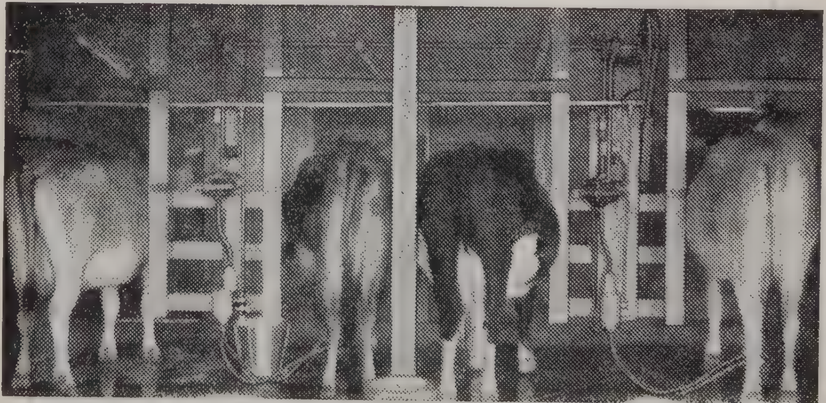

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★Good pasture seeds or crop seeds, and the limited fertiliser at present available, are practically wasted if land is not well drained.

★ Before the winter rains set in see that all open drains are cleared of growth, and that outlets to tile and mole drains are running freely.

SEASONAL NOTES

Farm Drainage

WITH the advent of winter farmers who usually have wet subsoil conditions to contend with at this period will be turning their attention to farm drainage operations. Most farms have their drainage problems, and the multiplicity of small areas with faulty drainage throughout our farmlands must make an impressive total of many thousands of acres with a very restricted production. Work already done has, in the main, proved a highly profitable investment, both from an individual and a national point of view, but there still remains a very wide field of economic land development possible through suitable farm drainage.

Advantages

Efficient drainage maintains the gravitational or excess water at a reasonable depth, enabling useful plants to thrive and beneficial bacterial and chemical actions to take place. The soil becomes more friable and is more easily worked, and more profitable crops can be obtained.

Drained pastures stand heavy stocking without pugging in winter, the sward changes for the better, and pastures come into production earlier in spring. Rushes, sedges, buttercup, and docks tend to disappear, while white clover and the better grasses increase during pasture transition. Instead of the utilisation of pastures being limited by poor drainage, the ground will be in a position to respond to good management, topdressing, etc., and stock ailments such as foot-rot, internal parasites, and malnutrition will have a lessened incidence.

Current Work

Existing drainage systems should be examined, outlets checked, open drains cleaned out, banks and bridges repaired, and necessary alterations or additions completed to improve effectiveness. Attention should be paid to drainage of surface water which collects after rain and is slow in getting away. Springs which are causing the waterlogging of ground in their vicinity should be directed to convenient outlets. Deep, open drains across lower faces to cut off seepage and surface water from adjoining hills should be considered to prevent waterlogging of lower paddocks.

Mole Drainage

The chief cause of poor drainage is lack of free natural drainage, because of the impervious nature of stiff clay subsoils restricting the gravitational movements of water, even where the fall is good. In the undrained state these soils are not only waterlogged over long periods, but they dry out unduly, causing soil surfaces to become parched and cracked during prolonged dry spells. Throughout both islands extensive areas of good-quality land, such as the lower ploughable slopes of much of the steeper hill country, also the rolling and terraced lands, lie wet and cold over the winter for this reason. Thousands of acres of such country are most suitable for mole draining, the essential features of which are the stiff clay subsoils, free from obstructions such as stones, tree roots, strong ironstone pans, or soft patches, and in addition having a good fall.

Extensive tile drainage on this country could be carried out only at prohibitive cost, and is, therefore, unwarranted. Mole drainage, if properly carried out, is both cheap and effective, with the added advantage of being easily renewed.

Planning the System

A clear understanding of essentials involved will reduce risk of partial failure, and time spent in careful planning of the layout for a mole drainage scheme will be amply repaid by results. A good system requiring careful work but less upkeep subsequently entails the collection of a small number of intermediate moles to outlet moles, which in turn are drained into short final tile drains. The fall must be apparent to the eye if a level and staff are not used. Each mole must maintain a steady fall throughout the entire length, running across the steeper places and down the gentler slopes, but having a more decided fall near the outlet. Effective spacing of drains is approximately 9ft.; they may be left wider across the steeper slopes and closer together when with the grade.

By drawing a main mole from the outlet across the intermediate moles at an acute angle, and digging down over each intermediate drain, near the point of intersection, a clean connection with a suitable auger is established with the outlet mole.

In making the permanent outlets a few 4in. unglazed tiles are laid at an angle, along several main outlet moles, with suitable holes at points of contact to reduce the number of outlets. Better flushing is obtained by fewer outlets, which, however, must all be protected from stock.

Depressions in drains will silt up if the fall is insufficient. The mole drain follows the surface of the ground, and preliminary attention may have to be given to surface irregularities such as feerings, particularly on the gentler slopes.

Depth of Drains

The mole drains must be down in the subsoil about 3in., and in practice

Type of country on which mole drainage can be most effective.

the depth generally ranges from 14in. to 18in. from the ground surface. Moles made too deep in the clay will last, but are less effective. The size of the plug used may depend on the tractor power available, but 2½in. or preferably 3in. plugs are suitable for most intermediate drains, and 4in. plugs are preferable for outlet moles.

Time to Drain

The most suitable time to mole drain is governed by the condition of the subsoil, which must be moist and plastic enough when the moles are drawn to ensure that the drains will form without cracking on the passage of the plug. On the other hand, dryness of the surface soil is required to assist drainage down through the cut made by the blade of the mole plough. With good rainfall in most districts, the subsoil should be in a good state for mole drainage from now on through to spring, provided the surface soil conditions are suitable.

No poorly-drained soil is able to produce satisfactorily, and no amount of cultivation, topdressing, or skilful management will take the place of adequate drainage, which is the fundamental requirement of a fertile soil. If first things come first, then farm drainage must receive first consideration.

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The weight of a cubic foot of roots in a clamp or pit is as follows:—Turnips, 33lb.; swedes, 34lb.; mangolds, 35lb.; carrots, 31lb.; parsnips, 31lb.; potatoes, 42lb.

Planning Future Feed Requirements

ATTAINMENT of the production objectives for the 1945-46 season is dependent in no small measure on the extent that farmers will undertake growing of fodder crops during the coming spring to supplement pastures next summer and winter. Such provision is generally inadequate, and with sufficient farm equipment available on most farms to carry out a reasonable programme, consideration should be given to additional ploughing for such crops, which could be grown with profit to meet stock requirements more fully, to facilitate pasture management, to improve existing swards, and to reduce the area in deteriorated pasture.

Eliminate Risk

The mild climate of the North Island offers the greatest scope for pasture improvement, but it is obvious that without supplementary fodders gross production from grassland is limited. A total dependence on grass and the grassland products hay and ensilage alone involves an increasing element of risk, as production rises to a higher plane with better grass utilisation, unless supplementary fodder crop provision is made.

A further difficulty in many localities is the reduction of surplus grass available for hay and ensilage as the result of fertiliser rationing for topdressing. Any larger area required for hay suggests an increased area in fodder crops.

In the colder southern districts four months' spring growth of pastures may represent 70 per cent. of the total grass production for the year. Growth is practically at a standstill over the winter and even into a late spring, so that winter feed provision, which must be correspondingly heavy, accounts largely for the more extensive growing of fodder crops in the south.

Mainly Spring Sown

Both summer and winter fodder crops are nearly all spring and summer sown, while cereals and temporary pasture for greenfeed are both spring and autumn sown, according to their place in the rotation. Preliminary cultivation for spring sowings should not be delayed if the ground is to be ready and in good heart for normal seasonal sowings, with timely maturity of crops for feeding and harvesting, and good yields.

Plan Winter Feed

Winter feed requirements show comparatively little variation from year to year, and the most suitable cropping programme for a particular farm is a matter of individual experience. Hay and roots of various kinds form the basis of supplementary feeding on most farms. Ensilage is used more for dairy cows, both in winter and summer, although it may also be fed to sheep. Hay, although more difficult to make in a high-rainfall climate than is ensilage, is more popular, as it is easier to handle and can be fed safely in quantity at all times of feed shortage.

On the average dairy farm hay, ensilage, and mangolds will meet the winter needs of the dairy herd and assist grass rationing for early-calving cows. Pigs, however, are an integral part of the dairy farm, and suitable home-grown crops will be needed for them. As the requirements for overseas are large, arrangements should be made to winter more sows and finish off the autumn litters. Approximately ¼-acre of crop per sow or pig equivalent will be needed.

Crops such as sugar beet, carrots, and pumpkins are palatable and nutritious, and in some districts are more reliable than swedes. Barley, maize, or peas balance the more watery feeds in the ration, and a suitable grain crop should be home grown if possible.

The sheep farmer in northern districts will require turnips and swedes or pumpkins for winter feed. Chou moellier, early autumn sown for winter feed, has a limited application, and although the yield is less than

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A 38-tons per acre crop of cattle pumpkins in the Gisborne district.

with root crops, it is very useful with hay for hoggets.

Hill-country sheep farms, particularly in the North Island, supply much breeding stock, and more use might be made of the ploughable portions of such farms for winter feed to build up constitution in the hoggets and the breeding ewes.

Summer Needs

In some seasons the dairy herd may be in need of greenfeed soon after Christmas to keep up the milk flow. Lucerne would supply this, and, if not required, may be converted into hay, an advantage not possessed by crops such as early-sown soft turnips and chou moellier. Ensilage not used for winter feeding frequently proves very useful at this period.

On the sheep farm rape may be grown to fatten the tail-end lambs. Spring-sown chou moellier is less fattening than rape, and is about a month longer in reaching maturity, although it does not become overmature, as does rape. If sown in early October, the crop should be ready for lambs from the end of January onwards, but requires a hay or oatsheaf supplement.

Grass as Fodder Crop

While young permanent pasture should not be treated as a supplementary forage crop, good summer feed is produced by spring sowings with rape or red clover of the quick and readily-established Italian, perennial, and the new H1 ryegrasses. In the same way excellent winter feed is produced from these grasses if they are sown in the autumn with a cereal in place of rape.

Rotation and Pasture Sowing

Following winter supplementary forages the land is available for spring sowings, and in districts with heavy winter feed requirements, where really only one crop a year can be grown, this has led to the less favourable spring sowing of both cereals and pasture. Frequently late maturity or delayed utilisation of the forage crop results in hurried preparation of the seed-beds, which is also not in the interests of good pasture establishment.

Two crops a year will often grow well in the North Island, but the second crop, such as rape, early soft turnips, green maize, or a special hay crop such as Algerian oats and tares, should be off the ground in time for autumn sowing of pasture. A more fertile seed-bed is obtained by discing instead of ploughing the fed-off crop, such as rape.

The best possible conditions are necessary for establishment of permanent pasture, and intermediate cropping should have this aim in view, rather than regarding pasture as a means of providing a change from cropping. At the same time there are many unprofitable, worn-out pastures on soils of low natural fertility which require renewing, but if these are unsuitable for cropping they should be resown to grass without cropping, and management directed to maintaining them in good condition.

Crops for Conditions

Arrange cropping programmes to suit conditions. Maize, pumpkins, millet, and sorghum are very susceptible to frost, and are more suited to the warmer climates. Peas and

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barley for grain are grown in districts where harvesting conditions are reasonably reliable. Harvesting of maize presents little difficulty on the small dairy farms in the north. Swedes require a cool, moist climate, but should not be grown where club-root is prevalent; chou moellier may be safer. Greenfeed cereals may be grown in the autumn to make up for poor yieilds with the swedes.

Avoid badly-drained paddocks, as few crops thrive with "wet feet"; this is especially so with lucerne.

Mangolds and sugar beet require high fertility and mellowness of soil, and may be grown again on the same ground successfully, due to their freedom from disease.

Cattle pumpkins, unlike mangolds, grow well with rotting vegetation, which in a suitable climate makes them a useful first crop after ploughing grassland. Low soil moisture in drier districts limits the growing of such crops as mangolds, swedes, and chou moellier. It has been estimated that a 50-ton crop of mangolds transpires moisture equivalent to a 20in. rainfall per annum, but successful crops are actually grown in fairly low rainfall areas on good, deep soils following early ploughing.

A rotation of crops spreads the work of the farm, and careful planning will tend to eliminate peak periods of labour. Some crops involve little labour, but crops such as mangolds and carrots require much handwork in thinning and intercultivation. To reduce this work to a minimum the dairy-farmer should choose the best ground available and produce heavy crops on relatively small areas in paddocks convenient for cultivation and carting out or feeding, as the handwork entailed is much the same for a mediocre crop as for a good one.

In every district are to be found a proportion of well-managed farms which give a lead to production by their well-planned routine, good pasture management, ample supplementary feed reserves, and overall high economic production.

Winter Tillage for Spring Cropping

AT this period of the year every opportunity should be taken when soil conditions permit to carry out preliminary work in preparation for August-September sowings of cereals, and also for fodder crops sown during spring and summer. If possible, have ploughing completed for roots and other crops before the cereals are sown.

If the land was previously in crop, it should be deep ploughed and left for working up later. Swede crops, however, may not be eaten off much before August, and if a cereal crop is to follow, no time should be lost in preparing the seed-bed after the feeding off.

Breaking up Grassland

Skim plough grassland and later work the "skim" with the discs before deep ploughing, which will reduce the cultivation required in the spring, and save valuable time, as the soil will be easily worked to the bottom of the furrow with the discs. On the other hand, if grassland is deep ploughed only, repeated discings on the inverted sod may be required in spring before a satisfactory seed-bed is obtained. Late ploughing would increase this difficulty. Early ploughing gives a better distribution of work, a longer weathering period for the soil to mellow, and, in dry districts, will bring about a better reserve of soil moisture.

After deep ploughing the ground should be left undisturbed for a period, and subsequent cultivation should not be undertaken unless the surface soil is sufficiently dry.

On light land the roller may be required to bring about better consolidation, in which case roll on the furrows in the direction of ploughing, and utilise the roller in preparation of the seed-bed. On heavy land rolling is apt to cause caking of the surface. As a rule rolling is unnecessary, as heavy soils pack well.

Ploughing of grassland may be undertaken when heavy cultivated land is too wet to work, but deep ploughing should be deferred if glazing is apparent on the furrow slice.

In the North Island dairying districts, with their high rainfall, early winter ploughing is not required. Winter fallowing may even be disastrous, as twitch plants such as *Poa pratensis* or browntop are rejuvenated by winter ploughing in the warm climate. In the north roots and other crops frequently follow grass, and while the land may be skim ploughed, disced, and later deep cross-ploughed, more often it is simply deep ploughed about mid-August. This allows sufficient time for the sod to rot before the ground is worked to a fine tilth by repeated discing, harrowing, and rolling.

On account of spring weeds two ploughings of normal depth must be avoided, as the second ploughing brings back to the surface the weed seeds buried by the first ploughing. This does not occur with skim ploughing and subsequent deep ploughing. If the surface soil dries out in a lumpy state impossible as a seed-bed, it may be necessary to replough and work the soil while moist for a seed-bed. The weed seed position should influence depth of reploughing, although weed seeds in the surface of a prepared seed-bed, if encouraged to germinate, are readily killed out by periodical harrowing until sowing time.

It should be borne in mind that light, friable soils may easily be worked too fine by surface cultivation. The degree of fineness required depends on the crop to be sown. Small-seeded crops such as lucerne, carrots, turnips, mangolds, and sugar beet require shallow planting on a fine, firm seed-bed, whereas large-seeded crops require fineness below the surface.

—E. M. BATES, *Instructor in Agriculture, Alexandra.*

Ploughing in maize stalks in the winter in preparation for spring cropping in the Gisborne district.

ORCHARD AND VINEYARD

Pruning Apple and Pear Trees

THE pruning of apple and pear trees should be the principal work in the orchard during the next few months, and there should be no delay in starting one of the most essential operations in successful fruit-growing. Frequently growers do not start this work early enough, with the result that, in many cases, the work is slumped at the latter end of the pruning period. It is wise, therefore, to begin with the more essential work and to do it thoroughly, leaving, if necessary, blocks of apple trees which are almost certain to produce a normal to heavy crop and of only moderate growth, and rely on thinning to retrieve the position.

Whatever system is adopted, certain principles must be kept in view. Each tree presents a different problem, and should be studied carefully before pruning is started. If the previous season's growth is small, the pruning will be different from that used where strong, heavy growth has been made. It must be remembered that there is a close relationship between growth and fruiting, and that fruiting generally decreases with heavy and excessive growth, and increases as the tree settles down to maturity. An effort should therefore be made to produce a good balance between growth and fruit, to maintain good fruiting wood throughout the tree, and at the same time show a good average growth.

The vigour of the tree is largely dependent upon its leaf surface, and pruning should be done to maintain an adequate supply of large, healthy foliage, without which neither good growth nor fruit can be obtained.

Permanent and Temporary Wood

The difference between permanent and temporary wood in fruit trees should be observed, and the tree pruned accordingly. When a young apple tree is planted the first consideration must be given to the permanent wood, or the wood which is to remain in the tree and which consists of the trunk, leaders or main branches and sub-leaders, or heavy fruiting branches coming from the leaders. Temporary wood, or wood which is often depleted or renewed to make room for further temporary wood, consists of laterals and fruit spurs. This temporary wood cannot be provided successfully unless the permanent wood is first established. Therefore the first aim of the pruner should be to build up the permanent parts of the tree, so that when the time arrives for the temporary wood to start work the tree will be sturdy and capable of bearing the strain that may be caused in the carrying of the crop.

Young trees should not be allowed to carry fruit too early, as this often results in a stunted tree with little or no vigour when the tree should be coming into full bearing. Some varieties are much more dwarfing than others, but no variety, irrespective of strength, should be allowed to bear fruit until the permanent wood is established.

The number of leaders required will be influenced to some extent by climatic conditions of the district, class of soil, and the variety of the tree planted. The reduced leader system is being used extensively in some districts, and it is claimed that by this modified system more space is available between the leaders for the development of fruiting wood, a better quality fruit is produced, and trees carry as much fruit as those with a larger number of leaders.

General Pruning

Extended and weakened laterals on bearing apple trees should be cut back to strong buds, or another strong shoot arising from a strong bud. New shoots should be thinned out and those retained shortened to about half their length. Dense trees may also be thinned out by the complete removal of crowded main limbs. In some cases where growth has stagnated, hard cutting back may be necessary to stimulate growth, even to the extent of bare-poling the tree and allowing it to refurnish itself.

Some varieties such as Sturmer and Dunns are inclined to become over-spurred, in which case a detailed thinning out of fruit spurs is required. In most cases new growth will result from such cutting. Varieties such as Rome Beauty and Irish Peach are tip-bearers and make spurs rather sparsely. With these varieties the increase in fruiting is by the natural division of laterals from terminal buds, which also carry fruits. It is only when fruit is inclined to become small that a thinning out of laterals becomes necessary.

Pruning Pear Trees

The pruning of pears is, in the main, similar to that of apples. Pears as a general rule are more prone to become

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spur-bearers, and varieties such as Winter Nelis are such prolific producers of spurs that fruit production is frequently retarded by this oversupply of worn-out buds. In such cases a drastic thinning out of these spurs is recommended. As with apples, a thinning out of exhausted wood followed by its replacement with new growth is required. Overcrowded young laterals should be either left uncut for fruiting, or removed entirely. Rational pruning aims at the production of regular and heavy crops, and, if followed, the tree should at no time be thrown into excessive growth, nor will stagnation result. Either of these extremes is the result of a faulty pruning system.

Grafting

Scions for grafting may be selected at the pruning period from trees of good habits. The wood should be of the past season's growth, well ripened, and free from pests and diseases. As these scions will not be required for some months, it is advisable to bury the ends about 4in. in the ground in a shady position.

—*D. J. HOGG, Orchard Instructor, Mapua.*

Citrus Notes

Citrus Bud Production

CITRUS growers are handicapped by failure to select and make available to the industry the best trees of the different varieties as a source of bud-wood for propagation purposes. It has been demonstrated in other citrus-producing countries that there can be, and generally are, many different strains within a variety, such strains varying in quality of fruit, tree vigour, date of maturity of fruit and many other ways. A bud used for tree propagation purposes transmits to that tree its characteristics, so that the best type of tree and fruit cannot be secured unless the bud used is taken from a tree that has the most desirable qualities. As nurserymen generally have a limited number of trees available as sources of bud-wood, many of the trees raised may not be of the best type.

A citrus bud-selection scheme was formulated by the Horticulture Division in 1940, and committees were set up in all the main citrus-producing areas to further the objects of the scheme. It was hoped that through this organisation all trees reported to be above average for the variety would be placed under observation with a view to determining which were the best trees as sources of propagating bud-wood. For the scheme to develop as it should, the co-operation of citrus growers generally is essential and it is necessary for growers to report to the Orchard Instructor for the district any tree or trees which they consider might be worthy of placing under observation. Where such arrangements are made, samples of the fruit will be examined annually by the central committee and the co-operation of the growers secured in keeping productive records.

When trees have been proved to be suitable as sources of bud-wood, arrangements may be made for the sale of buds to nurserymen and growers. Such selected trees should prove extremely remunerative to the owners and provide liberal compensation for the work involved. However, it is considered that the possible profits from the sale of bud-wood should be a secondary consideration, and that all citrus growers will have sufficient interest in the future progress of the industry to assist whole-heartedly in this necessary effort to raise the standard of lemons, grapefruit, oranges and mandarines. As most kinds of citrus fruits, other than lemons, are harvested between July and November, it is important that outstanding trees should be reported immediately so that arrangements can be made for taking records before harvesting begins.

Grapefruit Maturity

New Zealand grapefruit are unsuitable for dessert purposes during the early part of their season. Growers are therefore reminded of the following provisions of the New Zealand-grown Fruit Regulations, 1940, controlling marketing of such fruit.

Regulation 2 defines "Dessert Grapefruit" as grapefruit of the type of Poorman orange known as "Morrison's Seedless strain" or other seedless strain substantially similar thereto, and includes any other grapefruit having **a degree of maturity suitable for dessert.** "Marmalade Grapefruit" means grapefruit of the type of Poorman orange not included in the definition of Dessert Grapefruit, and any other kind of grapefruit or sour orange having a degree of maturity suitable for marmalade.

Regulation 11 prescribes grading standards for "Dessert" grapefruit, which provide that such fruit shall be **mature and tree-ripened,** etc.

Regulation 12 prescribes grading standards for "Marmalade" grapefruit, which provide that such fruit shall be **mature,** etc.

The object of making this distinction between the two standards under separate regulations is an endeavour to induce growers in their own interests to increase the demand for "Dessert" grapefruit.

Regulation 18, 2 (b), reads as follows:—"Prior to being packed in packages for sale, all fruit shall be graded in accordance with the grading standards hereinbefore prescribed for the particular kind of fruit in question." To comply with this regulation the packages must be branded either "Marmalade Grapefruit" or "Dessert Grapefruit" and the grade under which it is packed and the count in the case.

Packing and Sizing

From observations made of packages of Meyer lemons, grapefruit and oranges there is every indication that many growers are not paying the necessary attention to the packing of their fruit. A bushel case should contain a minimum of 40lb. of fruit when it arrives at its destination. Cases correctly packed and with a moderate bulge on the lid will readily contain this weight of fruit. Looseness in the pack is frequently the cause of under-weight, which can be avoided by firmly pressing every alternate layer of fruit as the case is being filled. Uneven sizing of fruit also may be responsible for a loose pack and should be corrected. Advice on the correct packing of citrus fruit may be obtained from the Orchard Instructor in your district.

Citrus brown-rot

A Bordeaux spray 3-4-50 should have been applied to all citrus trees not later than the first week in June for the control of citrus brown rot (*Pythiacystis citrophthora*), except orchards which have so far not been troubled with this disease. In affected orchards to wait for the appearance of infection before applying the spray often results in serious loss of fruit and foliage before the spread of the disease can be arrested. Orchards known to be particularly subject to attack by this fungus should receive a second spray application about four to five weeks after the first, as infection may take place at any time up to September. Thorough spray coverage on the lower branches is of greatest importance, as the disease spreads from the ground upwards.

—*P. EVERETT, Orchard Instructor, Kaikohe.*

Work in the Garden for July

UNDER existing conditions, pride of place in the garden plan should be given to potatoes and also to the examination of tubers which may be held in store. As seed may not be readily available in the quantity required, tubers of a suitable size should be carefully selected and properly boxed for sprouting.

There is no need to rush into premature planting. That way surely lies disaster and disappointment. Where possible, the area to be planted should be dug now, more particularly if it has a green manure crop growing. When turned over, the soil is better left untouched so that it will get the benefit of the wintry weather conditions that may still be expected. Later, when planting time arrives, the soil will be found to be in better condition and much more friable than formerly. No lime should be applied to the area it is intended to crop with potatoes.

Lettuce

To obtain supplies of lettuce for late spring and early summer, seed should be sown without delay. Unless a particularly well sheltered part of the garden is available and selected for a small seed-bed it is better to use a box. As has been previously advised, a box 1ft. square and 2½in. deep will conveniently grow more plants than are usually required in the home garden for one planting. To produce early crops, a light soil is preferable. On heavy soils a raised bed will ensure better drainage and warmer soil conditions which are so necessary for early plant growth.

DON'TS.

DON'T overlook examining potatoes in store. From these may be obtained seed for next season's planting.

DON'T neglect to make provision for composting all material that can be secured. Blood and bone manure may be in short supply, and all available compost will be necessary for the coming season's cropping.

DON'T hesitate to apply a pinch of nitrate of soda to spring cabbage plants. It will materially assist their development during cold weather.

DON'T decline assistance to a fellow-gardener when his distress becomes apparent. Cultivate the spirit of comradeship, which is always characteristic of the successful vegetable-grower.

Onions

Onion plants from autumn-sown seed may be set out during late July or early August. To secure long-keeping bulbs, planting at this period is necessary; ground preparation should rightly have started in autumn. If a green manure crop is growing where the onion bed is to be made it should be dug in without delay and the soil permitted to settle down. Where the garden soil is light, good consolidation is very desirable for the onion crop. To assist in quick decomposition of the green manure crop, sulphate of ammonia broadcast at 1oz. per square yard before digging is recommended.

Broad Beans

There is still time to make a sowing of broad beans. For quick growth, a sheltered part of the garden is necessary, but the position chosen should not be such that the tall bean foliage will at a later date cast a shadow on an early spring crop. A square, shallow trench 3in. deep should be made and the soil at the bottom loosened before the seed is planted. This will permit easy root penetration. Four to six inches between the seeds will be sufficient. If the plants are to be grown in double rows—and this practice is frequently adopted—the trench should be 12in. wide and the seed "staggered." This means that when the seed is being set those in one row should be opposite the space between the seeds in the opposite row.

Beetroot

In most districts a sowing of an early-maturing variety of beetroot may be made. No special preparation of a small area is really necessary, provided the soil is in reasonably good condition. Any of the Egyptian turnip-rooted varieties will be suitable for the first sowing.

Cabbage (Golden Acre)

Mid-July is the time when seed of Golden Acre summer cabbage should be sown, and to make sure of having good, stocky plants at the time of setting, sowing in a box not less than

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4½in. to 5in. deep is recommended. This cabbage, which is one of the easiest vegetables in the garden to grow, will follow Flower of Spring for harvesting and provide a really fine green vegetable right up to Christmas. A part of the garden which has grown a winter crop of lettuce or leeks will be suitable. Soil for growing the seedlings should not be too rich. Ordinary potting soil, a mixture of equal quantities of good garden soil, compost and river sand, is considered excellent for the purpose, and will produce good plants.

Peas

Seed for peas may be sown from now onwards without danger of loss, except on water-logged soils. Peas are a cool weather vegetable, and produce their heaviest crops before the advent of hot weather. Cold, wet soil conditions do not, however, favour best production, and are the main cause of poor germination and root-rot. A well-drained part of the garden should be chosen for this early sowing and the seed placed 1½in. to 2in. deep. Preparations with which pea seed may be treated to prevent rotting in the soil during wet weather may be obtained from seedsmen. Copper carbonate or copper oxide (red or yellow) may be used, but only a very small quantity is necessary. The seed, together with a teaspoonful of either of the above-mentioned dusts, should be placed in a tin, and, with the lid on, rolled round until the peas are completely coated. The seed should then be put into a sieve to remove the surplus dust, when it can be sown at once.

Radish

When salad material is in short supply from the garden, radish will be a welcome addition. A small area is all that is necessary, but it should be well drained. The seed of either a globe-shaped or long variety may be sown broadcast or in rows. Of the former variety Scarlet Globe and French Breakfast, and the latter, Long Scarlet and White Icicle can be recommended. The germination of radish seed is particularly good, and the subsequent growth so strong that if the roots are to be consumed during their most palatable stage only small sowings should be made. There is also a Chinese Winter White or Celestial radish variety which, although it grows to the size of a large carrot, is stated to be crisp, of mild flavour, and will stand longer than ordinary radish before going to seed.

Spinach

Before making sowings of spinach seed it is necessary to know that the soil contains plenty of lime, as the plants cannot be grown successfully on an acid soil. When the area on which the bed is to be made has been dug over, lime (preferably agricultural lime) should be liberally applied at ¼lb. per sq. yd. and worked into the soil. Quick-acting fertilisers are necessary to produce crisp, tender plants, and a mixture by weight of 1 part sulphate of ammonia and 3 parts superphosphate broadcast 3oz. to 4oz. per sq. yd. will supply the necessary plant food. This fertiliser should be applied at least 14 days before sowing the seed. If this is not practicable it may be done after germination, but none of the mixture should come in contact with the plant foliage. The lime application as recommended above should **not** be mixed with the fertiliser before application is made. Sow seed in rows 12in. apart. Prickly seeded varieties are those mostly grown in New Zealand.

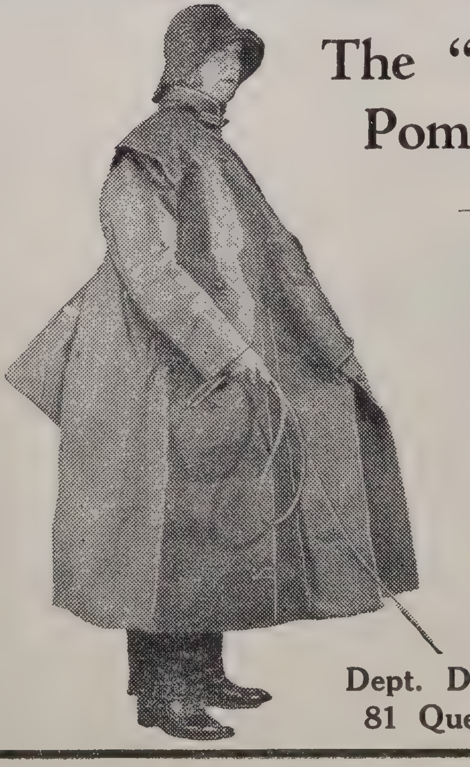
Turnips

If a sowing of turnip seed is made during July—and the young roots will be a desirable addition to the vegetable menu—it should preferably be an early and quick-maturing variety. Turnips sown before mid-August will not remain long in a matured condition before "bolting" to seed. It is for this reason that an early variety should be selected. Early White Milan is suitable for the season. It has a small tap root, shaped rather flat, and matures quickly. No special manuring is necessary, but superphosphate 1oz. to 2oz. per sq. yd. would be beneficial.

Rhubarb

Rhubarb roots which may have been dug out and placed under a hedge, as recommended in the June issue of the "Journal," should be closely watched for appearance of prominent "buds." When these appear, they shoot from the root like one's finger-top, and are pink coloured. If the root is not divided the buds will develop quickly and will soon show a tendency to burst. Division of the root should take place before this stage of development is reached. A very large knife or a sharp tomahawk is quite suitable for cutting the roots. Only vigorous-growing, single buds should be planted and no stalks removed from them during the first year's growth. Provided the roots are not quite ready for dividing, the planting position can be prepared. A part of the garden should be selected which will not be interfered with for three or four years. Holes should be dug and partly filled with well-rotted stable or farmyard manure, which should then be covered with soil and allowed to remain in this condition until planting takes place.

—D. K. PRITCHARD, *Instructor in Vegetable Culture, Wellington.*



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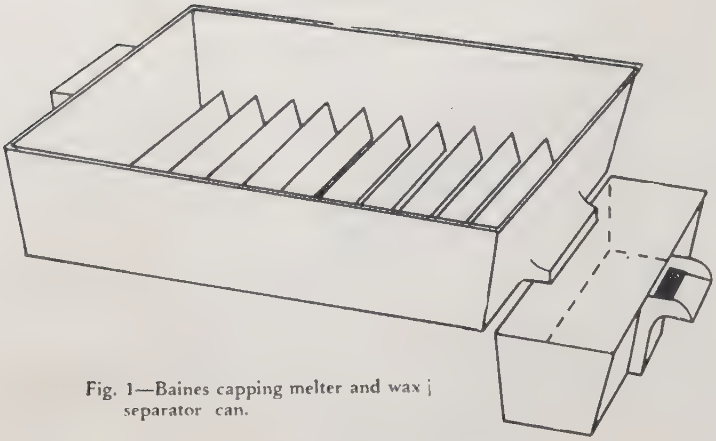

Fig. 1—Baines capping melter and wax separator can.

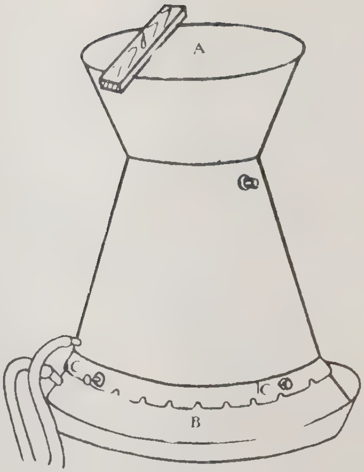

Fig. 2 — Smedley capping melter. Cappings drop into hopper A, then through heated compartment to outlet B. Screws C adjust opening.

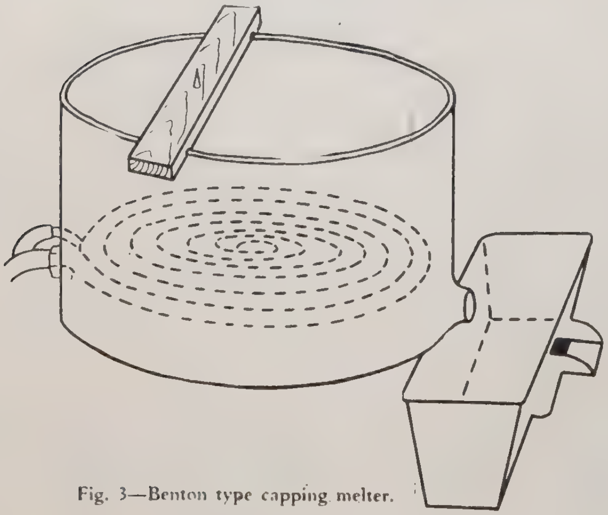

Fig. 3—Benton type capping melter.

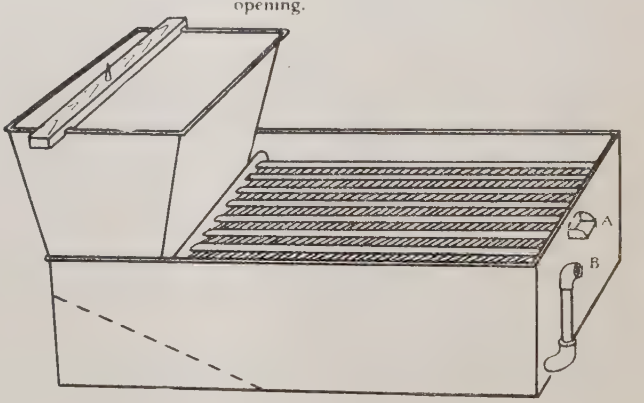

Fig. 4—Brand capping melter. A. Wax outlet. B., Honey outlet.

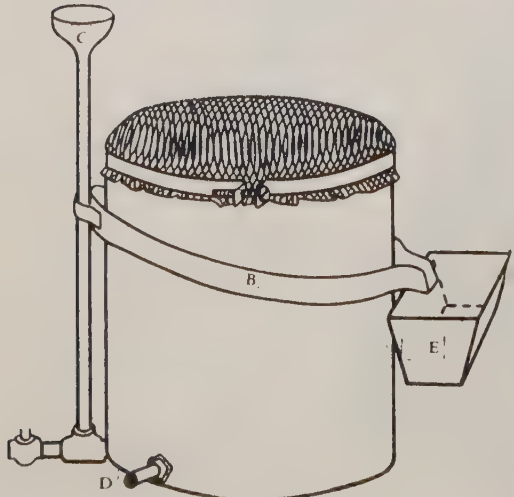

Fig. 5—Dunstan wax melter.

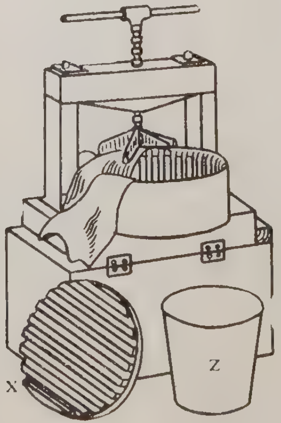

Fig. 6—Hatch wax press.

NOTES FOR BEEKEEPERS

Capping Reducers and Wax Presses

BEESWAX is a valuable product of the apiary, and its preparation for the market should be given due attention to ensure maximum returns. Some of the main sources of supply and methods of separation from the honey are described in this article.

Cappings

As all combs of honey have to be uncapped before the honey can be thrown out by the centrifugal force of the extractor, large amounts of what are called "cappings" accumulate as extracting proceeds. The amount of cappings secured varies considerably, according to the method followed. Some beekeepers cut very lightly with the uncapping knife, while others cut quite deeply into the comb. This latter method ensures even combs and ensures a larger amount of beeswax at the end of the season, and is quite satisfactory, provided the system adopted for dealing with cappings does not darken or impair the flavour of the honey. It has to be remembered that the deeper the knife cuts into the combs, the more honey goes into the cappings and less comes out in the extractor, whereas what is really desired is a maximum of honey through the extractor and a minimum through the cappings.

The following is a description of the various types of capping reducers in use which can be termed the "one-operation" type. In these the cappings are reduced as they come off the uncapping knife, and at the same time the honey is separated from the melted wax.

Baines (Fig. 1).

The sides and vanes are water jacketed and heat is generally applied by means of an oil or primus stove. If steam is available in sufficient quantity, it can be used by running a lead into the water intake. Uncapping is done directly on to the vanes, and, as these are spaced with only a small opening, slum gum often causes a blockage. This is a disadvantage, for the honey and wax will then "stew" until a clearance is effected, and honey should never remain in contact with a heated surface for a longer period than is absolutely necessary.

Smedley (Fig. 2).

This works on the same principle as the Baines, although of entirely different construction, and has the advantage that the opening through which the melted wax and honey has to pass can be adjusted. This melter requires a considerable steam supply, and is rather complicated in construction.

Benton (Fig. 3).

This is a very simple type of melter consisting of a flat coil of tinned copper tubing. The coiling has to be accurately done to ensure an even spacing between each turn of the tubing. This is set in a container about 2in. from the bottom, and steam is used to heat the coil, on to which the cappings drop. The honey and melted wax flow out of an opening below the coil.

Brand (Fig. 4).

This melter is designed on an entirely new principle. In all the previous melters the honey and cappings passed over a very hot surface sufficient to melt the wax which is then separated from the honey by means of a separating can. In the Brand the combs are uncapped into a hopper, and the cappings fall into a compartment which is just slightly warmed to allow a separation of the honey from the wax. As uncapping proceeds the cappings rise to the surface, until eventually they come into contact with the steam-heated grid. The melted wax can then flow away into moulding tins. The honey which is underneath this grid passes out of the honey outlet. This type of melter is suitable only for the larger beekeeper. A considerable steam supply is required, and a certain amount of difficulty appears to be encountered at the end of the day when the slum gum has to be cleaned out from the grid.

Beekeepers using any of the above melters generally find that the honey is darkened in colour and the flavour impaired, the amount of deterioration depending on the skill with which the equipment is used. It is maintained, however, that this is offset by the convenience of having at a single operation the wax in a marketable condition at the end of each day's extracting. Other types of capping reducers melt the wax into commercial blocks after the cappings have been allowed to drain for a short period. With this type the method is to secure as much honey as possible from the cappings before heat is applied. This is generally accomplished by uncapping directly into wire baskets, which give a maximum draining surface, or by using a warming tray as described in the December, 1944, issue of the "Journal." After draining the cappings are placed in a specially-built electric oven, and slow heat causes most of the remaining honey to flow away before the wax begins to melt. The small amount of honey left reacts to the effect of the accumulated heat and drains away in unsuitable condition for marketing, except for manufacturing purposes. The period taken to reduce each ovenful of cappings is generally about 12 hours. This type of melter is rather expensive to install, and the cost of running is high.

Where cappings have been well drained the following wax melter has many features to recommend it. It is described in "Bees and Honey," published by the Department of Agriculture, New South Wales, and is called the Dunstan wax melter. (Fig. 5).

The container may be made out of a 40-gallon drum, but a 12-gallon drum would probably meet the requirements of all but the large commercial beekeeper. When the top is being cut out the rim should be left as this forms a very valuable grip for the strainer cloth. The channel B should be either soldered or brazed on to the drum, with a slope of about 2in. to the outlet. Three-quarter inch pipe fittings can be used for the filling funnel C. Inlet D is for the use of steam where it is available, otherwise the drum will have to be placed over a gas ring or a fire out in the open.

The method of operation is as follows:—Place clean water, preferably rain water, into the drum until the

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water inlet hole is covered; then fill up with cappings. When the contents are melted more cappings can be added to bring the level nearly to the top. Stretch over the opening in the drum a piece of strong material sufficiently fine to give good straining. To fix this cloth securely against strain use a metal band with a tightening bolt similar to a hose connection, and clamp just below the rim. Heat should be reduced to prevent burning. Hot water is then slowly poured into the funnel until the wax comes up and is forced through the strainer cloth and runs down the side into the channel B, then into the moulding can E. Water should be added, until all the wax has been forced out. Up to this point the wax comes away absolutely clean, as all the rubbish is kept beneath the cloth. To make sure no more wax remains an empty can should be placed under overflow B and more water added. A big strain is now placed on the cloth, hence the necessity of having it securely clamped on. With the pressure, the water now forces its way up through the cloth and carries with it any remaining wax, which floats on the water in the can.

Old or Damaged Combs

Usually combs culled out because of damage or excessive drone cells will yield barely sufficient wax to warrant the time and inconvenience involved, unless a wax press is used. An efficient press will secure all the wax possible. In the past many of these presses were equipped with an outlet which enabled the water and wax to run out as soon as pressure was applied, with the result that the inside of the press cooled down very quickly. A press as shown in Fig. 6 overcomes this drawback, and the usual method of working is as follows: Have two drums on a fire out in the open, one for melting down the old combs and the other for a supply of hot water. When the combs have been thoroughly melted down the cloth is spread neatly inside the press with the edges up over the sides. A dipper full of hot water is splashed into the press, which is then three-quarters filled with the melted combs. The edges of the cloth should be folded over, the follower X placed in position on top, and pressure applied by means of the screw. A further dipper of hot water splashed over and into the press assists to keep the press and all liquid hot. As the pressure is slowly increased the water and wax rise up inside the press. The press is then swung on its hinges and the wax and water allowed to drain into bucket Z. Pressure is then released, the cloth removed, and the rubbish tipped out. Work quickly, press small amounts, and use plenty of water for the best results.

Many beekeepers consider wax rendering a most unpleasant job, and this avenue of income has not received the attention that it should have. Where satisfactory equipment is used the unpleasantness of the job can be reduced and the returns greatly increased.

C. R. PATERSON, Apiary Instructor, Hamilton.

WAIKATO WASPS
Not New or Dangerous

SPECIMENS of wasps whose appearance in the Waikato during April was responsible for some alarmist reports in the Press were sent to the Cawthron Institute, Nelson, for identification, and the report of Dr. David Miller dispels any suggestion of a new and dangerous species having been introduced to the Dominion.

The wasps are of the species *Vespa germanica* of the Northern Hemisphere. There is no record of when the wasp first appeared in New Zealand, though it is reported as having been found in the Wairarapa prior to 1922.

The insect is merely a nuisance, and there is no record of its being a major pest. Throughout the spring and summer the wasp feeds almost exclusively on other insects. In the late summer it sometimes attacks ripening plums and may attempt to rob beehives, but it can do very little harm to a strong colony.

The *Vespa vulgaris,* a species related to the *Vespa germanica,* was collected in the Wairarapa some time prior to 1916, and another very common species from Tasmania, *Polistes humilis,* has been well established in the Auckland Province for many years.

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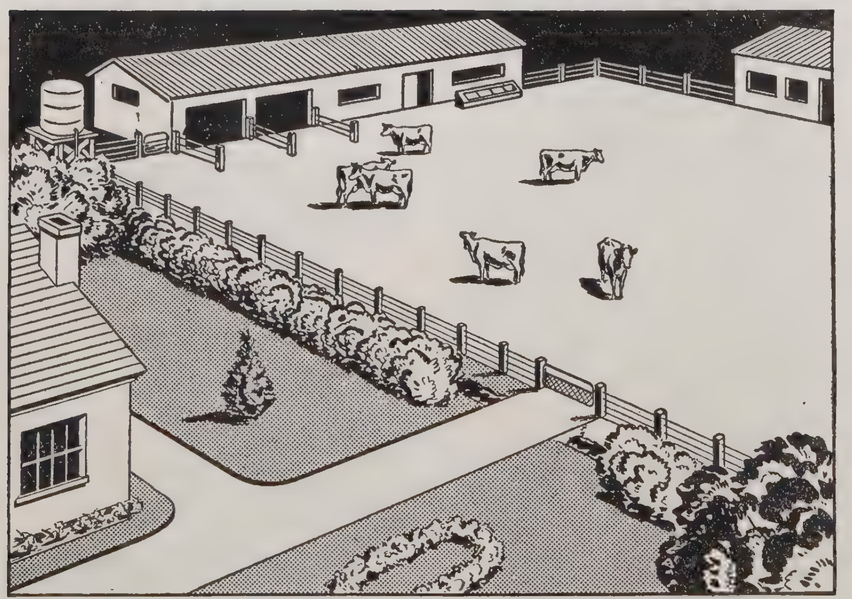

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Care of Breeding Stock and Hatching Eggs

WITH the approach of the breeding season the management of breeding stock, both male and female, and the care and selection of hatching eggs are aspects of poultry husbandry which deserve the utmost attention.

It is true to say that good pullets can not be made from bad chickens; that bad pullets can be reared from good chickens; and poor chickens hatched from eggs of stock that has been carefully selected and blood-tested for pullorum disease. Given reasonable incubation, the last can be due only to faulty management of the breeders, or the hatching eggs.

One of the more common causes of chickens failing to hatch well and come up to the desired standard is that the hens are overweight or underweight. With the new crop of feathers practically grown, it is possible for some birds to store up large amounts of surplus fat in the body before coming into production. This results in slow egg production, increased infertility, poor hatchability and a large proportion of misshapen eggs. While the breeders must not be starved, neither should they be overfed. In this connection a great deal depends on the attendant. The correct feeding of birds at this time is simplified by grading them into classes in order of their stage of moult.

Rest the Breeders

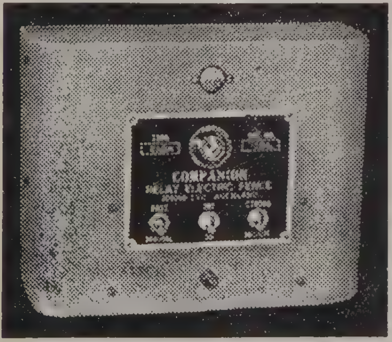
For best results the hens should all have a rest from production before being required to furnish eggs for the incubator; this applies particularly to the late moulters. Generally the latter are the best layers, and if allowed to lay right on to May or June, these birds, which are the poultryman's best breeding proposition, are either out of production at a time when breeding eggs are required, or are laying with insufficient spell, thereby lacking the desired rest and recuperation necessary for the production of strong, virile chicks. Drastic measures may be necessary to induce these prolific layers to moult, but this is essential. One method is to withhold feed or water for two days, which will result in all but the most stubborn ceasing production.

When the hens have fully regained their vitality, are settled comfortably in their breeding quarters, and fertile eggs are required within three to four weeks, the cockerels should be introduced, care being taken at this time to see that all birds are free from external parasites. The birds should have been dosed for internal parasites prior to the cleaning out of the houses.

In flock breeding with the Mediterranean breeds, Leghorns, Minorcas, Anconas, etc., it is usual to allow one cockerel to each 10 hens, and with the heavy breeds, Orpingtons, Rhode Island Reds, etc., one cockerel to eight or nine hens. This will allow for the discarding of an odd cockerel, which may "crack up." It is easy to take a male bird from the breeding pen, but owing to the danger of fighting it is dangerous to add one.

The hens should be checked over, and any birds which have failed to come satisfactorily through the moult, or are showing signs of scouring, should be removed from the breeding pen. Where good runs are available these should be fully utilised. If the breeding stock is kept intensively, the grain should be well scattered in deep litter to ensure the birds having sufficient exercise. As at all times, the birds should have access to clean fresh water, and oyster shell and metal grit. As an added precaution oyster shell dust or limestone flour at the rate of 1 per cent. and salt at the rate of 1 per cent. should be added to the mash. In the less sunny districts it is a good policy also to add cod liver oil at the rate of one and a half pints per 100lb. of mash. The necessity for feeding greenfeed at this season cannot be too strongly emphasised. Greenfeed should be fed as a separate meal, and large quantities will be consumed, especially by second- and third-year hens.

Strong and vigorous male birds, particularly cockerels, quite frequently fall away in condition when put into a breeding pen, with a consequent loss of vigour and fertility. This is generally due to their not eating sufficient food, more especially when it is fed in troughs or shallow litter. Hens consume their food quickly while the cockerels are standing back. Again, when the evening feed is given the cockerels are usually busy



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mating. To overcome this difficulty it is a worthwhile proposition to feed the male birds separately, when they very soon become accustomed to their separate feed if this is given at a set time each day. No bother is then experienced in letting the males out separately, as they are very eager for this feed. Light-breed cockerels will consume up to four and heavy breeds up to five ounces of food at each feed. Dubbed cockerels will often eat better in the pens than full-combed birds. Where dubbing is practised it should be carried out at least two weeks before mating. Under the New Zealand Poultry Flock Improvement Plan farmers may dub their cockerels prior to their being passed by the accreditation body, if the birds are passed by an officer of the Department of Agriculture at the time of blood testing.

CARE OF HATCHING EGGS.

IT is an advantage if hatching eggs can be kept clean and set in their natural condition, without the bloom being destroyed by washing. A little added care in this direction during the hatching season is well worth while. Very few eggs will be soiled if the house floors are covered with a good depth of clean, dry litter and the nest boxes are kept clean and well supplied with chaff, machine shavings, wheat cavings, sand, or other suitable material.

Eggs should be collected three or more times daily. As it is not usually convenient to bring the eggs up to the egg room as often as this, a common and good practice is to collect the eggs into a nest or box from which the birds can be kept, or a wire basket suspended from a wall or roof. The eggs are then collected from the laying houses every afternoon, care being taken to keep the eggs from each pen separate. A small calico bag marked on the outside with the pen number is ideal for collections from single-mated pens.

The eggs should not be left in tins or buckets overnight, as this may sweat or chill them, either factor being detrimental to incubation. On removal from the buckets or bags, the eggs may be graded for size, shape, and correct colour for the breed, then marked on the large or aircell end of the egg with the pen number and date laid. For example, an egg from pen B on the 10th of the month would be marked B 10. Pens which are laying a large proportion of infertile eggs are thus readily checked. This is also a useful method of checking cockerels, the results obtained being a valuable guide when considering these birds for use another season. The marking of the date safeguards against eggs being unwittingly kept too long.

Storage

The eggs are now ready for storing. When the infertile egg is laid slight development of the germ has already taken place and consequently, in the storing of eggs, care must be taken that the delicate young embryo is not weakened or destroyed. The optimum temperature for holding fertile eggs is from 50° to 60° F. This is important, as excessively low temperatures cause the embryo to weaken, and there is the added danger of broken yolks. A high temperature is equally bad, as incubation recommences at a temperature a little under 70°.

To maintain as even a temperature as possible eggs are stored large end uppermost in boxes or racks, and after allowing a minimum of 24 hours for the eggs to cool, they are covered with chaff. If boxes are used, the next day's eggs may then be packed on top, or, on farms where racks are used, a cover of stiff paper or felt is an added insulation.

Eggs should be set as soon as possible, preferably not more than 10 days after being laid. Eggs kept longer than this gradually lose their vitality. The longer eggs are kept, other conditions being equal, the poorer the hatchability. If eggs are to be kept more than a few days, they should be turned daily; when eggs are kept in boxes this is accomplished by placing a six-inch block under an alternate end of the box each day. Trays may be kept, and turned, in a frame, similar to the tray-holding frame of a cabinet incubator.

Eggs kept under these conditions, and handled with a minimum of jarring, are a big help in securing good hatches and consequent improved rearing.

—R. E. GUY, Poultry Instructor, Wellington.

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YOUNG FARMERS' CLUBS

Meeting of Y.F.C. Dominion Executive Committee

A MEETING of the Y.F.C. Dominion Executive Committee was held at Christchurch on Thursday, April 19. Those present included Mr. T. E. Streeter (Dominion president) in the chair; Messrs. S. G. Avery (Dominion vice-president, and chairman, Wellington Council); F. S. Atchison (chairman, Auckland Council); E. Rabbidge (delegate, Otago-Southland Council); J. Barclay, R. G. Jolly, S. A. La Roche (delegates, Canterbury Council); B. J. Collerton, J. L. Sunderland, A. D. Young (delegates, Wellington Council); I. D. Spratt (Auckland Council); L. W. McCaskill (Lincoln College); W. A. Jacques (Massey College); and S. Freeman, Dominion Organising Secretary. Mr. T. W. Andrews was present by invitation, as a delegate from the Canterbury Junior Chamber of Commerce. Apologies were received from Messrs. L. J. Wild (grand patron); D. S. Ross (immediate past president); A. S. Trotter (chairman, Otago-Southland Council); R. W. Wightman (chairman, Canterbury Council); M. Donald, W. F. McLaren (Wellington Council); P. Nicol, G. Spratt (Auckland Council); W. King, S. R. Whyte (Otago-Southland Council); J. M. Smith (Director of Fields Division, Department of Agriculture); J. H. Bremner (N.Z. Farmers' Union); and C. H. Schwass (hon. treasurer).

The president referred to the excellent representation from the various councils, and welcomed Mr. T. W. Andrews, of the Canterbury Junior Chamber of Commerce. He mentioned the work carried out by the councils in the revival of clubs. He visited the Bay of Plenty towards the end of March on the occasion of his radio talk from 1YA, Auckland, and had visited four clubs in that area. He was very hopeful of the future of the Y.F.C. movement, and trusted that much valuable work would be done at the meeting.

There was a credit balance of £821 9s. 8d., which included the current year's grant of £500 from the Government. It was decided that the sum of £100 be paid out to each of the four councils, with a recommendation that their funds be used to the best advantage in promoting the welfare of the Y.F.C. movement in their respective areas. The Organising Secretary reported on the present position of the movement throughout the Dominion. A number of clubs had been recently revived, and there were now close on 100 clubs operating successfully. He made an appeal for clubs and district committees to send in more and fuller reports of their activities, these reports being of particular value to other units of the organisation, and also as propaganda.

Resolutions Carried

Mr. S. G. Avery (vice-president), who was the federation's delegate to the Education Conference held at Christchurch in October last, reported on the proceedings of the conference. Members congratulated Mr. Avery for the capable manner in which he had acted for the federation, and also complimented him on his report. As a result of recommendations made by Mr. Avery, arising out of his report and the work of the conference, the following resolutions were carried by the meeting:

(a) "That a booklet be compiled recording the history of the Y.F.C. movement in New Zealand, the work it has carried out since its formation, and the policy it has in view for the future."

(b) "That the federation endeavour to sponsor a 'sister' organisation with a similar governing body and general 'set up' to that of the Y.F.C., but with aims and objects focused on the interests and life of rural women; for example, to provide, among other things, tuition in poultry-keeping, horticulture (garden, orchard, etc.), homecrafts, arts, cultural and social subjects." A sub-committee consisting of the president, vice-president, Mr. Ross, and the secretary was set up to convene a meeting of delegates from the W.D.F.U., the Women's Institutes, the Rural Development Division of the Department of Agriculture, Massey and Lincoln Colleges, and the Department of Education, with a view to devising ways and means for the setting up of a suitable organisation.

(c) "That the federation make a survey of the Auckland Youths' Farm Settlement Scheme, Land Settlement under Rehabilitation, and any other proposed schemes for land settlement, with a view to formulating a practical land settlement scheme for Y.F.C. members." A sub-committee consisting of the president, Messrs. D. S. Ross, L. W. McCaskill, W. A. Jacques, S. A. La Roche, J. Barclay, F. S. Atchison, and A. S. Trotter was set up to conduct the survey, the four councils being requested to assist them in every possible way.

(d) "That the federation endeavour to obtain representation on any consultative or advisory body set up to deal with youth and adult education."

(e) "That the Y.F.C. movement maintain close contact with the Department of Agriculture and the agricultural colleges with a view to obtaining training for its members in the use of the latest methods connected with farm practice and machinery; and that early enquiries should be made for short specialised farm courses at the agricultural colleges." It was suggested that the educational opportunities afforded to country people in comparison with those of urban residents has a direct bearing on the drift from the country to the towns. Two sub-committees were set up to implement the resolution, one for each island, as follows: South Island, chairman of the Canterbury Council, Messrs. J. Barclay, and S. R. Whyte; North Island, Messrs. S. G. Avery, D. S. Ross, J. L. Sunderland, and G. Spratt.

Memorial Scheme

A considerable sum has already been collected in the Bay of Plenty for the Y.F.C. memorial scheme. Suggestions as to the form that the

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memorial should take had been asked for from units of the federation, but the sub-committee dealing with the matter had received very little assistance, only about a dozen suggestions having come forward so far. It was felt by members that the general collecting throughout the Dominion should be commenced as soon as possible; some, however, considered that it would be of definite advantage to know the manner in which the memorial would be established. The sub-committee would be making its final recommendations to the annual general meeting of the federation, and it was decided that the finalising of the form that the memorial should take and the means of raising funds, and the arrangements of quotas, if necessary, be referred to the annual general meeting.

Following on a letter received from Mr. L. J. Wild, a motion was passed favouring the establishment in New Zealand of an adequate veterinary service. The conservation of soil fertility, which was referred to in the same letter, was also discussed. A report from the sub-committee set up by the Otago-Southland Council, at the request of the Dominion Executive Committee, to deal with cultural and aesthetic values was received, and the secretary's action in publishing it in the Y.F.C. section of the "Journal" was approved. The federation's representation on the newly-established Federation of Farmers was brought up, and Mr. J. Barclay, the Y.F.C. representative on the Dominion executive of the N.Z. Farmers' Union, was delegated to do all he could.

Remits

Among the remits carried were the following: "That where any funds are provided by the Y.F.C. movement for scholarship or bursary purposes they should be devoted to short-term in preference to long-term courses"; this remit was sponsored by the Auckland Council. From the Wellington Council: "That it be a recommendation to all councils to adopt the same scheme (or one similar) as that inaugurated by the Wellington Council in regard to a roll of honour plaque (as set out in the Y.F.C. section of the 'Journal of Agriculture,' February number)." A remit from the Canterbury Council pointed out that transport and other difficulties had made it almost impossible to secure representation from the Nelson and Marlborough districts, and consideration might be given to the formation of a separate council or sub-council embracing these areas, in order that interest could be maintained there. The secretary was instructed to investigate the matter and report back to the Dominion Executive Committee at the first opportunity.

The duration and date of the annual general meeting were discussed, and it was decided to hold a two-day meeting at Hamilton on Wednesday and Thursday, June 27 and 28.

More Club Reports Wanted

(By S. G. Avery, Dominion Y.F.C. Vice-president).

THE reporting of all club activities is the responsibility of the secretary and is one in which he should take a special, personal pride. The reports appearing monthly in this section of the "Journal" are of immense value to all units of the federation in the following ways:—

1. Members of District Committees and Councils take a great interest in the activities of clubs, especially those in their particular area, as it assists them in knowing the strength, interests, and problems of these clubs. The work of the District Committees, Councils, and Federation can then be directed to give the maximum assistance to the clubs.
2. All Y.F.C. members receive the "Journal of Agriculture," and in reading the activities they obtain valuable ideas which they can, in turn, adopt in their own clubs, i.e., subjects for lectures, debates, demonstrations, competitions, etc. They are also able to compare the work of their own club with that of others and develop a spirit of friendly rivalry.
3. Finally, but by no means of least importance, these reports give publicity to the personalities and talent among members. They give publicity not only to the work of the organisation as a whole, but to the worth of the local Y.F.C. in the eyes and minds of the numerous readers of the "Journal of Agriculture."

Unfortunately, however, the reports of club activities do not at present give a complete picture of the work being carried out by our Y.F.C. movement. Although there are approximately one hundred active clubs in the Dominion at the present time, the greatest number of reports received and published in the "Journal" in one month during the past year has been 36. This means that the majority of the clubs known to be active are not sending in reports. This is a serious matter and one which should receive immediate attention by the members of clubs concerned.

Of the reports being received quite a number lose a great deal of their value by giving insufficient detail. Such details as the attendance at meetings, name and profession of lecturer, titles of debates, and names of team, etc., are often omitted.

In order to assist club secretaries the following suggestions are made:—

(a) Use the appropriate Y.F.C. report forms obtainable on application to your district secretary, or to Box 3004, Wellington.

(b) Make out your report and forward two copies to your district secretary **as soon as possible** after each meeting, field day, etc., otherwise considerable delay in publication is likely to occur. If no district committee is at present functioning, send the reports direct to Mr. S. Freeman, Box 112, Palmerston North.

Details Required

Annual Meetings: Use form Y.F.C. No. 5, and fill in all the information about election of officers, etc. As this form has no provision for reporting other business, this should be done on additional sheets and attached with a copy or the original annual report and balance sheet of the club. If you have only the one copy of these, they should be marked "please return," which will be done after a copy has been taken.

Monthly Meetings: Use form Y.F.C. No. 2, writing a brief outline of the main points discussed in the **business** of the meeting, continuing on separate sheets if necessary. **Lecture, demonstration, etc.:** The name of the lecturer at a monthly meeting and his professional status should be shown, followed by some of the main points made by the speaker. **Debating Contests:** In reporting a debate at a monthly meeting or a special meeting the following details should always be included:—The subject, names of the members taking part, stating in which

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team (affirmative or negative); if possible, some of the points raised by various speakers, the names of the adjudicators, and the points given to each team.

Field Days: Use form Y.F.C. No. 3. Give details of attendance, time, and place; names of demonstrators, profession and subject; a brief outline of some of the main points made during the demonstration. The names of the competitors, as well as the winners of events held during the day, should be included.

The three Y.F.C. forms mentioned are particularly helpful to secretaries in setting out their reports, but should they be out of supplies they should not let this delay them in forwarding their reports for publication in the next issue of the "Journal."

In addition to these regular brief reports, articles on some special activity such as a field day, lectures of special interest, or visits to farms are welcomed for the Y.F.C. section and may be contributed by any Y.F.C. member accompanied if possible by snapshots. Every Y.F.C. member is urged to see that his unit is contributing in every way possible to the Y.F.C. section of the "Journal."

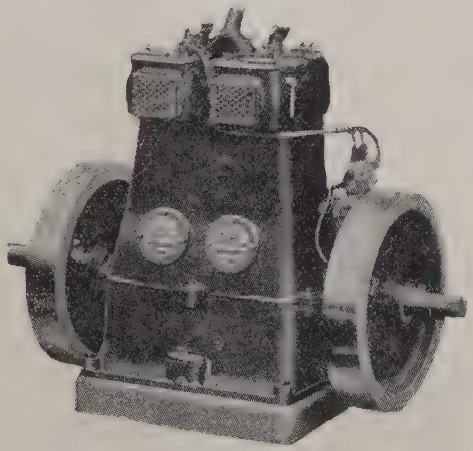
Another Air Force Y.F.C. Overseas

The following letter has been received from Flying Officer T. J. Butler, president, Young Farmers' Club, R.N.Z.A.F., N.Z.A.P.O. 308.

"A YOUNG Farmers' Club has been formed by Air Force personnel in this area a few weeks ago. On reading in the 'Journal of Agriculture' a letter from F/O Billings at A.P.O. 366, I decided to write and ask whether similar help could be given to our branch. We have now completed much of the original spadework in forming the club, and have meetings once weekly at which lectures are given by experienced Air Force personnel and by members of the Allied Services in the area. Our membership is in the region of 30, but an increase is expected when the lectures get into full swing.

"To supply some practical work arrangements are being made to start a pig farm here, and also to experiment with vegetable and grass growing. We would appreciate any pamphlets, literature, and advice on all aspects of farming, while correspondence with clubs in New Zealand will also be welcomed."

A supply of bulletins and pamphlets is being forwarded to F/O. Butler, and clubs throughout the Dominion are invited to correspond with him.



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Reports on Club Activities

WESTERN SOUTHLAND.

Dipton.—Annual meeting. Officers elected: Advisory president, Mr. F. T. McRae; chairman, E. Palmer; secretary, R. H. Jukes; treasurer, R. English. Eleven members present.

Drummond.—This club has recently been revived, after having been in recess for about three years. Officers elected: Advisory president, Mr. W. Stalker; chairman, H. Hubber; secretary and treasurer, J. L. Brown. There were 25 members present at the meeting, and there appears every prospect of the club doing well in the future.

Southland Technical College.—Annual meeting. Officers elected: Advisory members, Messrs. McKinnon, Beer, Stewart, and McDonald; chairman, V. E. Vial; secretary, K. E. Stevens; treasurer, I. Lloyd. There were 89 members present at the meeting.

Wyndham.—Annual meeting. Officers elected: Advisory president, Mr. F. J. Dunbar; chairman, T. M. Thwaites; secretary and treasurer, T. P. Rabbidge. A report on the recent Dominion Executive Committee meeting held in Christchurch was given by E. Rabbidge, a delegate from the Otago-Southland Council. There were 11 members present out of 12. Four of the club's members, E. Rabbidge, T. M. Thwaites, L. Mitchell, and T. B. Hunter, are visiting Tokenui for the purpose of forming a new club there.

EASTERN SOUTHLAND

Five Rivers.—Annual meeting. Officers elected: Advisory president, Mr. G. Muir; chairman, D. G. Muir; secretary and treasurer, B. Hamilton. The plans for the coming year were fully discussed. There were twelve members present out of 12.

DUNEDIN

West Taieri.—Annual meeting. Officers elected: Advisory president, Mr. D. Grant; chairman, S. K. Young; secretary and treasurer, D. A. Young. Eleven members present.

NORTH OTAGO

Enfield.—Annual meeting. Officers elected: Advisory president, Mr. G. Yuill; chairman, R. Buzan; secretary and treasurer, W. J. McClea. Twelve members present.

SOUTH CANTERBURY

Cannington.—Annual meeting. Officers elected: Advisory members, Messrs. W. Little, I. Scott, J. Kelynack, A. E. Gillingham, G. Squire, and H. Campbell; chairman, E. W. Hall; secretary and treasurer, D. G. Baker. Fifteen present at the meeting.

Geraldine.—Annual meeting. Officers elected: Advisory members, Messrs. W. S. Crotty and J. Little; chairman, P. Temple; secretary, I. J. Sheed; treasurer, D. E. Nelson. Twenty-five members present.

Pleasant Point.—Annual meeting. Officers elected: Advisory president, Mr. V. Wilson; chairman, J. W. Crombie; secretary, E. L. Esler; treasurer, S. W. Davey. Twenty-three members present. At a later meeting final arrangements were made for the club's annual ball, and a lecture was given by Mr. D. S. Loder on "World Affairs." At this meeting 26 members were present out of a total of 36.

MID-CANTERBURY

Ashburton District High School.—Annual meeting. Officers elected: Advisory president, Mr. R. M. McGregor; chairman, D. H. Gill; secretary, K. Frampton; treasurer, C. Gallagher. Thirteen members present.

Hinds.—Annual meeting. Officers elected: Advisory president, Mr. H. S. Chisnall; chairman, W. S. Taylor; secretary, G. A. Clarke; treasurer, K. McConnell. Twelve members present. At a later meeting an interesting lecture on "Irrigation" was given by Mr. G. G. Calder, Department of Agriculture. There were 14 members present out of 20.

Methven.—Sub-committee set up in connection with arrangements for a stock-valuation competition, as follows: R. J. Low, G. Limbrick, and S. Callaghan. Three new members enrolled. Decided that the Dunkley Cup speeches would be held at the next meeting. Stock-judging competition to be held on Mr. R. J. Low's property, and a social to be held in the evening. The winners of the stock-judging competition held at Methven were: J. Oldfield, 1; S. W. McKay, 2; A. A. Grigg, 3; B. Anderson, 4; W. Stevens, 5. A. McKay reported on the recent meeting of the Canterbury Council, held at Ashburton. Members present gave short talks on various subjects of interest. There was an attendance of 28.

CHRISTCHURCH

Ellesmere.—Annual meeting. Officers elected: Advisory president, Mr. G. W. R. Osbourne; chairman, B. K. Wagner; secretary, A. S. Ford; treasurer, A. Anderson. Twenty-three members attended out of a membership of 53.

St. Andrew's College.—Annual meeting. Officers elected: Chairman, D. G. Campbell; vice-chairman, D. J. Haines; secretary and treasurer, J. N. Weston. The meeting was addressed by Mr. Gardner, an advisory member, who gave an interesting talk on his trip around the world, and farming in different countries. The club has a full programme arranged for the coming year, which includes debates with adjacent clubs, speaking competitions, and visits to the woollen mills, freezing works, and bacon factory. There were 46 members at the meeting.

MARLBOROUGH

Flaxbourne.—Appointment of new trustee for Post Office Savings Bank account. Arrangements for club dog-trials. Address by Mr. D. J. Wilkie, Department of Agriculture, on "Surface Cropping as Expounded in 'Plowman's Folly.'" Fifteen members present out of 24.

HOROWHENUA

Levin.—Three new members enrolled. Members invited to attend a field day on "Pampas Grass" to be held at Manakau. Mr. Morton, of Massey College, was asked to speak on "Sheep Farming" at the next meeting. Secretary instructed to obtain bulletins on farming topics from the Department of Agriculture. Final arrangements for a club field day at Manakau. Talks were given as follows: "Judging Southdowns" (Mr. G. Mumford); "Romneys" (Mr. H. J. Lancaster); "Dairy Cattle" (Mr. C. Webb). Fifteen members present out of a total of 23.

MANAWATU

Apiti.—Successful dance held; two members of the club (F. G. Mapson and R. Harland), who were on final leave before proceeding overseas, were farewelled at this function. Decided to donate £5 from the proceeds of this dance to the Apiti patriotic social fund. A debate was held, the subject being "Does the Tractor Supersede the Horse?" R. Nicholson, N. Prujean, and F. Malone (affirmative); S. Watkins, J. Brungan, and Lance Hogan (negative). Fourteen members present out of 37.

Bunnythorpe.—Five new members enrolled. Decided that ladies be allowed to attend club meetings **only** at the invitation of the club. Mr. A. Hill, a club member returned from overseas, gave an interesting talk on "Greece." Sixteen members present out of 19. Officers elected at the annual meeting: Advisory president, Mr. J. Linklater; chairman, Trevor Hyde; secretary, Macgregor Donald; treasurer, J. I. Donald. Twenty-one members attended this meeting.

Feilding.—Annual meeting. Officers elected: Advisory president, Mr. A. C. Buist; chairman, E. Beazer; secretary and treasurer, D. Griffin. Ten members present. At a more recent meeting various matters were discussed, including the running of a spring show by the club. Mr. H. D. Brewster gave an interesting talk on Norfolk Island, in which he traversed the early history of the settlement, its subsequent development, and the present-day customs and trade of the island and its inhabitants. There were 17 members present.

Kairanga.—Dance to be held; special dance committee appointed. Lecture by Mr. H. A. Bayley, Inspector of Stock, on "The care of Cows after Calving, and the Correct Method of Drenching." Attendance of 26 out of a total of 28.

Pohangina Valley.—Decided to hold meetings at Raumai and Pohangina alternately in the future. A club debate to be held at the next meeting. A debate to be held with Whakarongo club in June. Address by Mr. W. McNab, local school teacher, on "The Establishment of Farm Shelters." Twenty-five members present out of 29.

Rongotea.—Five new members enrolled. Discussion regarding the Roll of Honour. At the invitation of the Farmers' Union the members attended the annual meeting of that body. There were 22 members present out of 37.

Whakarongo.—Decided to hold a club dance; arrangements left in hands of a special committee. Debating team selected to debate with Pohangina Valley Y.F.C. in June. Debate to be held at next meeting, subject to be "Stacking v. Baling Hay." Exhibition of films by Dr. Scott. In addition to an attendance of 25 members out of a total of 26, a number of friends and parents were present.

WAIRARAPA

Carterton.—Arrangements for the club's birthday ball. The club was founded on May 16, 10 years ago. A very warmly contested debate was held among the junior members, the subject being "That Tractors are more Economical than Horses."

Masterton.—Annual meeting. Officers elected: Advisory president, Mr. D. G. McLachlan; chairman, H. A. James; secretary, C. A. Mackay; treasurer, I. Rayner. There were 45 members at the meeting.

WANGANUI

Bulls.—Annual meeting. Officers elected: Advisory president, Mr. S. J. Avery; chairman, I. Jamieson; secretary and treasurer, D. Mitchell. The two past district committee meetings were reported by Messrs. A. D. Young and I. Jamieson respectively; Mr. Young had received the Bartosh Cup for the Wanganui district junior debating contest. It was decided that each member of the team should hold the cup for a short period, after it had been displayed in the window of C. H. Edwards Ltd. Discussion in connection with the Roll of Honour; Mr. S. G. Avery kindly consented to donate a wall-plaque similar to that shown in the "Journal" recently. Field day to be held in the near future. Reply received from Ohakea Air Force Station to club's request for instruction on the release of pilots from crashed aircraft. Marton club to be invited to be present when the instruction is given. Arrangements for the annual dance. Fourteen members present at the meeting.

Hunterville.—Annual meeting. Officers elected: Advisory president, Mr. C. Chisholm; chairman, J. Bartlett; secretary, R. Weston; treasurer, G. Bartlett.

Mangaweka.—Decided to enter both a junior and a senior team for the district debating contest, and also to enter for the district efficiency contest. Arrangements for a dance. A field day was held on Mr. Pairman's property, the owner giving the members present some excellent points for judging Southdowns, and also pigs and cows. Mr. J. Barnell demonstrated on beef cattle. Ten members attended.

Marton.—Correspondence received from two members in the forces acknowledging receipt of parcels and newsletters from the club. Two senior teams to be entered for the district debating competition; the club to enter for the efficiency contest. Arrangements for annual dance. Statement by secretary on the progress of the Federated Farmers; a talk on the new organisation to be included in the programme for next meeting. Report on recent district stock-judging competition. A lecture was given by Mr. Geo. McDonald, veterinarian, Rata, on the principal bacteriological diseases of animals. Twelve members present out of 22.

Ohakea.—Annual meeting. Officers elected: Advisory members, Messrs. C. E. Vile and C. Eglinton; chairman, G. Bailey; secretary and treasurer, E. K. Dittmer. Ten members present.

TARANAKI

Alton.—Annual meeting. Officers elected: Advisory president, Mr. J. Ward; chairman, G. J. Ritchie; secretary and treasurer, H. D. Campbell. Seventeen members at the meeting.

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Pukengahu.—Annual meeting. Officers elected: Advisory president, Mr. H. Blackstock; chairman, J. Coffey; secretary and treasurer, R. Moore. Decided to start a Roll of Honour. A combined visit by the Alton and Pukengahu clubs to Massey College to be arranged. An afternoon visit to Eltham Rennet Company. Report on the cricket matches played during the season; the Pukengahu Y.F.C. team finished up second in the Central Taranaki Competition. Best bowling average for the team was made by A. Dick; best batting average by R. Haseltine. Eleven members out of 28 at the meeting.

SOUTHERN HAWKE'S BAY

Ballance.—Field day to be held on Mr. R. Cleghorn's property. Report by Mr. J. H. Bremner on the recent meeting of the Wellington Council at Palmerston North. Mr. T. J. Cotter, president of the Pahiatua Farmers' Union, gave a very interesting book review on "Plowman's Folly." Seventeen members present, being a 100 per cent. attendance. At a later meeting Mr. Dalgleish, veterinarian, Pahiatua, gave an address on "Diseases in Sheep." Fifteen members present.

Dannevirke.—Roster of lecturers and subjects drawn up by the committee for the ensuing year approved. A debate to occupy one meeting, and the final of the prepared short talks to take place at the November meeting. The secretary, J. L. Sunderland, reported briefly on the recent Dominion Executive meeting held at Christchurch, and G. Redward reported on a meeting of the Farmers' Union gift stock committee. Decided to purchase a "one-panel" Roll of Honour through the Wellington Council, and to erect it in the F.U. meeting room where the club meetings are held; if necessary an additional panel can be procured at a later date. Short talk by a club member, K. Tait, on "Sabotage of Farm Implements." The speaker for the evening was Mr. T. D. Scott, headmaster of the Dannevirke District High School. He commenced his address by commending the Y.F.C. movement, and the Dannevirke club in particular, for the good work being done for young farmers and for the country as a whole. His main subject was "Germany and the Germans," and by outlining their history and their characteristics, he led up to the present Nazi regime. Continuing, he outlined various schemes to prevent another world war, and left the members plenty to think about. There were 31 members present out of 47. A field day was held recently, in conjunction with the Farmers' Union, at the Mana Stud, Umutaoroa; demonstrations included the following: "Romney Sheep," "Working Dogs," "Fat Bullocks and Pastures."

Mangatainoka.—Decided to invite the Ballance club to attend a lecture by Mr. J. E. Hewitt, to be arranged. Address by Mr. A. H. Dalgleish, veterinarian, on "Diseases in Dairy Cattle"; the speaker answered many questions after his talk. Attendance of 14 members.

TE KUITI

Paewhenua.—Annual meeting. Officers elected: Advisory president, Mr. P. D. Crowley; chairman, W. Pepperell; secretary, L. Harnett; treasurer, L. McIvor. Fourteen members attended out of a total of 21. At a more recent meeting an address was given by the advisory president on "How to Conduct a Meeting." Sixteen members present.

Te Anga Central.—Annual meeting. Officers elected: Advisory president, Mr. D. A. Burt; chairman, W. Wright; secretary, J. F. Philips; treasurer, J. H. Fordham. Fourteen members present.

WAIKATO

Cambridge.—Letter from C. Fisher (a member overseas). Trustees elected for the club funds. Arrangements for a club dance. Address by Mr. C. Meredith on "A Polo Trip to Australia." Ten members present out of 55.

Okoroire.—Discussion regarding the Y.F.C. Memorial. Arrangements for a dance in the Tirau Hall. Decided to secure a set of "Economics and the Land" through the A.E.S. Suggestions regarding a reference library. Nine new members enrolled. Address by Mr. Turner, manager, Tirau Dairy Factory, on "Cream Grading." Twenty-one members present.

Tahuna.—Annual meeting. Officers elected: Chairman, A. L. Hopper; secretary, M. C. Croad; treasurer, W. Solley. One new member enrolled. Debate to be held on the subject "Pick-up Bailer v. Stationary Bailer." At a more recent meeting the chairman resigned owing to military duties, and D. White was elected in his place. At this meeting two new members were enrolled. Decided to hold meetings fortnightly in an endeavour to raise the membership of the club to pre-war standard. Field day to be held shortly.

Te Awamutu.—Report on the annual meeting of the Waikato District Y.F.C. Committee. Arrangements for an essay competition, with a view to providing a broadcast talk from 1YA in July. Field day to be held on Mr. Cowie's property, Parawera. Four-minute speeches by members on subjects of agricultural interest. Fourteen members present out of 38. At a previous meeting a discussion took place on the winter farm schools to be held at Claudelands and Morrinsville. Report by R. Mandeno on the recommendations of a sub-committee set up to consider a proposed memorial to club members who had made the supreme sacrifice. Arrangements for a field day on Mr. McWilliam's farm. Reports on the feeding and management of groups of calves placed first, second, and third in the club's recent calf competition; D. Hodgson, 1; H. Donaldson, 2; D. Ellis, 3. Lecture by Mr. M. Dodson, veterinarian, on "Animal Nutrition." Thirty-eight members present.

BAY OF PLENTY

Paengaroa.—One new member enrolled. Arrangements for a stock-judging field day at Mr. Page's farm. Practice debate to be held; 16 members to participate. Interesting talk by E. Pinker, a member recently returned from overseas, on his impressions of farming in Egypt and Tunisia. A lengthy discussion took place on the proposed Y.F.C. Memorial Scheme. Nineteen members present out of 58. Officers elected at the annual meeting: Advisory president, Mr. J. B. Cawte; chairman, I. Spratt; secretary, K. Conway; treasurer, M. Steel. Thirty members attended this meeting.

Pukehina.—Arrangements for a dance. Instructive lecture by Mr. A. V. Allo, Department of Agriculture, on "Pampas Grass." Eighteen members in attendance out of a total of 22.

Tauranga.—Two new members enrolled. Dance arranged. Debate to be held. Players for a seven-a-side football team selected. Mr. A. Voss spoke on conditions and farming problems in the Mediterranean area, as seen by the forces in the Middle East. He also showed and described a number of souvenirs, and detailed some of the movements of the forces from Greece to Rome. Eighteen members attended out of 30. At previously unreported meetings Dr. Hopkirk, of the Animal Research Station, Wallaceville, spoke on "Mastitis and Contagious Abortion," and Mr. G. P. M. Whitham addressed the meeting on "Various Aspects of Herd Management." Officers elected at the annual meeting: Advisory president, Mr. T. F. Ridder; chairman, D. A. Coubrough; secretary, J. H. Carlyle; treasurer, L. A. Wilson. Attendances varied from 19 to 21.

Te Puna.—Business meeting. Arrangements for a dance. Seven members present.

Waimana.—General business and impromptu speeches by members for the purpose of selecting a team to contest the district inter-club shield. Twelve members present out of 20. At the annual meeting the following officers were elected: Advisory president, Mr. C. R. White; chairman, P. Clarke; secretary, J. T. Cain; treasurer, H. C. White. The Dominion president, Mr. T. E. Streeter, was present at this meeting; 16 club members attended and also four visiting members from the Western Bay of Plenty.

Welcome Bay.—Dance committee of six members appointed. Presentation to be made to a member recently married. The secretary reported that the fishing trip had been poorly attended, but a very pleasant day was spent by those able to be present. Prize money for the dairy cow judging at the recent field day to be presented at the forthcoming dance. All members present gave short, impromptu speeches on subjects of general interest.

AUCKLAND

East Tamaki.—Election of delegates to Auckland Y.F.C. District Committee: Mr. J. Valder (advisory member), L. W. Gubb, and G. W. Guy (active members). Arrangements for future field days and meetings. One new member enrolled. Interesting lecture by Mr. Bleekly, woodwork instructor, Otahuhu Technical High School, on "The Care and Use of all Tools connected with Building." The speaker stressed some of the finer points of building, with diagrams, and answered numerous questions. Twenty-one members present out of 27.

Franklin.—Field day to be held. Forthcoming district committee meeting discussed with delegates. L. Aldridge appointed as press representative. Mr. G. Worsfold, LL.B., B.Com., gave a very interesting address entitled "The Law relating to the Land." He explained how the ownership of land had progressed from feudal times down to the present land transfer system, and dealt with the rights and obligations that were conferred on a person by the holding of a title to land. There was an attendance of 26 members.

Harrisville.—Officers elected at the recent meeting to revive the club's activities after an interval of two years in recess: Advisory president, Mr. H. W. Barnaby; chairman, W. Barnaby; secretary, N. G. Barrett; treasurer, G. Wilcox. Lengthy discussions took place in connection with the club's future activities. Sixteen members in attendance.

Pukekawa.—Reports on sports held during three Saturdays of the month; two comprising cricket, and one with baseball and general athletic events, at which there was an attendance of about 100. All three were very successful. Discussion regarding future field days, on both a club and district scale. A debate was held in which all members present took part, the subject being "Horses v. Tractors." Mr. McIntyre acted as judge, and gave some very constructive criticism and some sound advice on debating in general. Twelve members present out of 20. At the following meeting, at which 17 members attended, two members were selected to represent the club in the stock-judging competitions at the forthcoming district field day. After this business had been disposed of the club went into open meeting with the Franklin veterinary club; Mr. Robieson (chairman of the veterinary club) spoke on the work of the club, and Dr. Seigel spoke on "Animal Ailments."

NORTH AUCKLAND

Kaukapakapa.—Annual meeting. Officers elected: Advisory president, Mr. B. Jones; chairman, G. McLean; secretary, R. McLean; treasurer, C. Hooper. Arrangements for a field day at Messrs. Lange and Tambour's piggeries, Waimauku. Lecture by Mr. P. S. Syme, Department of Agriculture, on "Pasture as an Indication of Soil Fertility." Sixteen members present.

Whangarei District High School.—A club has recently been formed at the Whangarei District High School, with an initial membership of 43. Officers elected: Advisory president, Mr. H. R. Howard; chairman, D. Worthington; secretary, A. Hutchinson; treasurer, G. Cliff. This club appears to have every prospect of success, and should prove a useful recruiting ground for other clubs.

Whirinaki.—Annual meeting. Officers elected: Advisory president, Mr. J. Latta; chairman, S. King; secretary and treasurer, Geo. Wynyard. Twelve members present.

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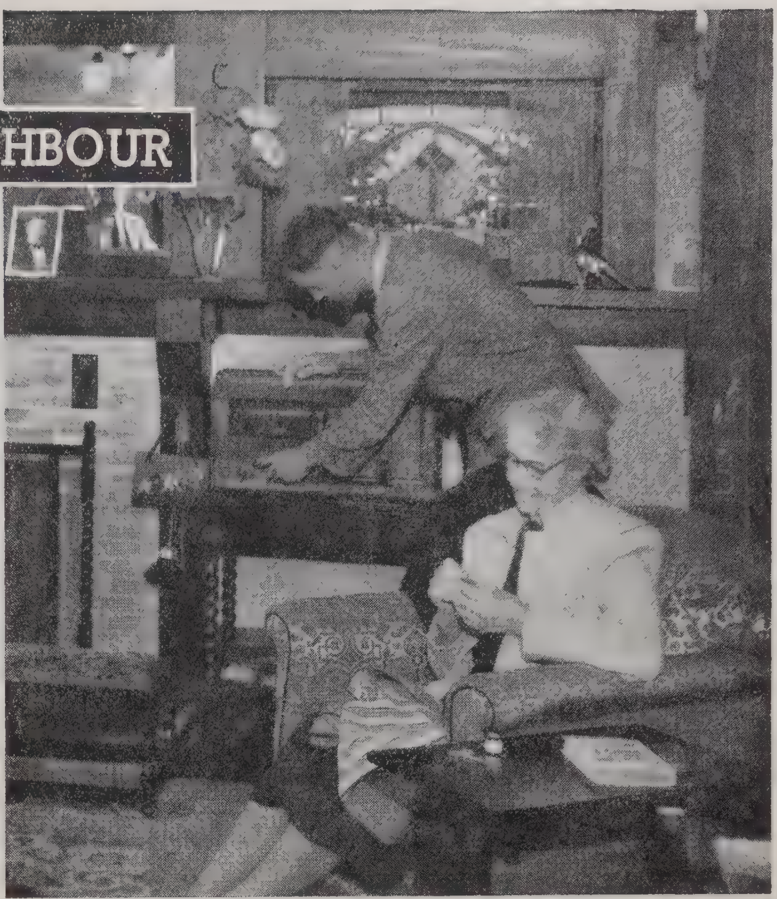


I WONDER how many readers have a bird for a pet. One woman I know is the proud owner of a bluey-grey parrot with a vermilion tail, brought to her from South Africa by a relation some years ago. The bird not only possesses an extensive vocabulary, but can imitate the tones of various people's voices in the most remarkable way, and is so pampered in consequence that he virtually rules the household. My neighbour's aviary is full of love-birds—turquoise and amethyst, opal and gold and jewel-green, they dart continuously from one branch to another till the air seems an ever-changing pattern of iridescent hues. The local fishmonger has a penchant for these dainty little birds, too, and exhibits a pair of them in his shop. It is not at all unusual for a customer to spend far longer admiring the bright-winged birds than in the selection of her purchase.

A friend of mine persuaded her husband to build a dove-cote in a sheltered corner of the garden, and she now specialises in pigeons—the white, fantailed variety; another keeps bantams, whose habit of roosting in trees is a source of constant amusement both to her and her small son. A third friend spends most of her spare time teaching her budgie to talk and perform various tricks. So far, my own experience has been confined to canaries. I used to have one with plumage the colour of sunlight and a voice sweeter than the love-notes of Tutanekai's flute. It was pure joy to listen to him. I faithfully carried out all the instructions I received concerning his care; but, alas! despite my efforts he succumbed during a particularly cold spell in mid-winter. Though nearly a year has passed, the memory of my little bird of sunshine remains a poignant one and the yellow cage is still empty.

The child who looks after a pet bird or is taught to put out crumbs and other titbits for the sparrows and starlings and blackbirds which throng the lawn is much more likely when he finds a bird's nest to leave it inviolate than to display an acquisitive attitude towards its precious contents. Parents would do well to encourage their children's interest in the bird-life of our own country. We have over 200 different kinds of native birds, of which quite a large proportion are species not found in any other part of the world. There are the flightless birds for instance: the weka, with its thrushlike call; the kiwi, which lays a bigger egg in comparison with the size of its body than any other bird; the kakapo, or ground parrot, which has a face like an owl and "grazes like a rabbit." The beak of the wrybill plover is shaped in a right-handed curve so that it can hunt under stones for food. The kea's powerful red wings range the mountain peaks, yet its cry resembles the plaintive mewing of a cat. The huia, whose plumes were greatly prized by the Maoris, is also unique, the male bird having a small, curved bill strong enough to drill holes in the bark of trees, while the female's beak is long and slender and suited to the task of probing after grubs.

No other poet has described our native birds more beautifully than Eileen Duggan. Her "New Zealand Bird Songs" include poems on the gannet, "grey like the water and white like the foam"; the graceful fantail; the blue-wattled kokako; the tui's golden chime; the wood pigeon—"O breast of soft, soft silver, O plumes of summer blue"; the shining cuckoo's cry, "pipi-wha-rauroa"; the hihi (stitch-bird), whose down is like "cloth of gold"; the bittern calling through the swampland; the migratory kuaka, or godwit, which flies to our shores every year from the tundras of Asia—

"We'll nest on the steppes and put on our red kirtles,
Teaching our scared little children to fly.
Then we stretch wing for the sea and the summer,
Forth in July; forth in July . . . .

Will you forget us or will you remember?
I shall remember, wherever I roam.
Look for me, sweet, on the first of December,
I shall come home; I shall come home."

Another writer who extols "Dame Nature's minstrels" is Perrine Moncrieff, and her compact volume, "New Zealand Birds and How to Identify Them," contains a wealth of interesting information for bird lovers. Mrs. Moncrieff is also a musician of considerable ability, and many of her pianoforte compositions are based on the lovely songs of our native birds. May all New Zealanders share her wish "to protect our feathered friends, which in addition to their usefulness, gladden us with their playful ways, glorious song, and marvellous plumage."

Mary

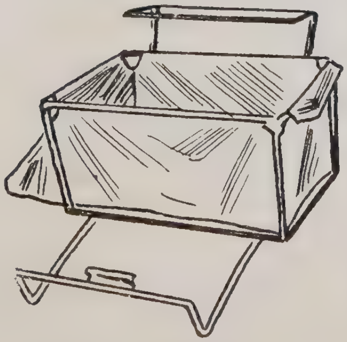
ROOSEVELT

THE latest biography of Franklin Delano Roosevelt is by a New Zealander, W. Philip Carman, of Wellington. Mr. Carman's interest in American affairs received considerable stimulus during his visit to the U.S.A. while on a trip round the world some years ago. His literary activities include numerous articles, two gardening booklets, and the editing of the "Gardener's Digest," and he has just been appointed editor of "Conquest," a magazine for youth which will commence publication shortly.

Although his account of the life of Roosevelt is brief in comparison with other biographies, none of the essential facts relative to the history of the "greatest American of our age" have been omitted. Indeed, the author's concise treatment of his subject, combined with his graphic, straightforward style, gives the reader a vivid portrait of the late President, and also of those closest to him—his father, who supplemented a liberal education with sport, hobbies, and travel; his mother, who lived to see her son become a world-famous statesman; his wife, whose loyalty and co-operation rendered her such an invaluable helpmate, particularly after he contracted infantile paralysis, "a devastating blow for one who was a keen athlete and lover of outdoor life . . . For twenty-five years the paralysis crippled his body. But he mastered it. He kept it severely in its place and lived and worked like a perfectly healthy man." His brilliant and inspiring leadership, which shaped the destiny not only of the American nation but of the world, formed a splendid sequel to his heroic efforts in conquering his physical affliction.

The biographer's able summary of Roosevelt's political achievements—including the New Deal and Lend Lease, the latter being described by Churchill as that "extraordinary measure . . . which will stand forth as the most unselfish, unsordid financial act of a country in all history"—is nicely balanced by his apt word pictures of the man who during the difficult years of economic depression had friendly "fireside chats" with the people via the medium of the radio; who never at any time in his career "lost touch with humanity"; who established and endowed the Warm Springs Foundation, Georgia, for the benefit of cripples; who received an average of one visitor every quarter of an hour during the greater part of his office hours. "America's good fortune for just over twelve years was that she had in control a strong leader possessed of vision, wisdom, warmth, breadth of mind, tolerance, and a sense of humour. May he be the forerunner of a new race of statesmen."

What to do with Baby when travelling?



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Country Mother's Health Plan

AFTER reading the Department of Health's article on "Country Mothers and Child Health" I would like to tell you how I feed my family for health. (I know that unfortunately there are, and will continue to be, many country homes as described, while mothers assist in the milking sheds and consequently have neither the time nor energy to study food values or do the extra work entailed by a planned diet.) I start by feeding my garden soil and fruit trees with compost and organic manure. Fruit and vegetables are eaten raw as much as possible. When cooking vegetables I steam them or bake them on the oven shelf, peeling them only when necessary.

My children are all fond of milk and do not care for tea. Their school lunches consist of fruit and sandwiches of home-made wholemeal bread, with cheese, lettuce, eggs, fish, raisins, meat, liver, tomato, etc., for filling. They don't carry milk, as they have 3 miles to ride and a further 11 miles to travel by bus, but the milk jug is soon emptied after they return home. They are well sun-tanned and their teeth are good. They sleep on a wide verandah built especially for the purpose. The boys recently walked 35 miles in a day to the nearest beach, and the girl thinks nothing of riding 20 or 30 miles. Of course, they have had their share of sickness, but I pride myself they have strong constitutions—that is what I have striven for ever since they were born.—**"Glendine."**

Ambition's Heights

Where the trees climb the spur in a row,
To a copse on a breeze-fondled knoll;
Where the bluebells and red lichens grow,
That in beauty the sun's warmth extol;
Where quietly the brown beech leaves fall,
To crisp on the short, brittle grass,
I hark while heat-drowsy birds call,
And feel the caressing winds pass.
Far above me the mountains rise blue,
Rock-rugged, snow-mottled, austere.
They have cold, regal beauty, 'tis true,
But such beauty commands awe and fear.
From this knoll, then, I will not climb higher;
It is brown and sunwarmed and smooth;
To the mountains I will not aspire,
But will stay where the bird-croonings soothe.

—Elsie S. Arnold.

Polish Children's Concert

THE lights are lowered. The N.B.S. orchestra from 2YA is tuning up. Conductor Harry Ellwood raises his baton, and close on one hundred clear young voices join in the stirring strains of Poland's National Anthem. The singers represent a portion of the large party of Polish nationals, the majority of them children, to whom the New Zealand Government has offered sanctuary after their terrible experiences in Europe. It is now six months since, sad-eyed and thin to the point of emaciation, they reached these shores to make their home at Pahiatua. Now, as they stand before the crowded audience in the Wellington Town Hall, their smiling, rosy faces and sturdy limbs are eloquent tribute to the beneficial nature of the Government's hospitality.

THE curtain rises on a historical tableau depicting the King of Poland taking the oath to the new Constitution on May 3, 1791. The colourful costumes of the nobility and peasantry and the uniforms of the gallant Hussars form a brilliant contrast to the black robes of those members of the Diet who have brought the Constitution into being. The bells start to peal and in the Cathedral they sing "Te Deum Laudamus," the solemn notes of the organ heightening the impressiveness of the Latin hymn. Thus the Polish people give thanks for the new law, "founded on enlightenment and equality." We are indebted to Mrs. Zienciak for this and other tableaux occurring later in the programme, these being composed especially for this concert.

Now a group of small girls, with silken petals of white or crimson curling softly about their leaf-green skirts, present the Dance of the Poppies. First they dance in a ring, then in pairs—a white poppy and a red one together—next they glide into two lines, and finally form a circle again. Their arm movements are particularly graceful, giving the effect of poppies blowing in the wind, for the dance symbolises childhood memories of "green pastures . . . the countryside with its streams . . . the orchards and my little country home where all my happiness lay." I asked the teacher next to me the age of the smallest danseuse, a little fair-haired thing with an elfin face. She answered in her own language, with which I was totally unfamiliar, and then darted backstage to reappear a moment later all smiles while she demonstrated with her fingers that the little one was eight years old.

The choir now took the stage, and very trim they looked in their neat khaki, rather like the Guide uniform except for the colour. A number of the girls had tied their plaits with blue or cream ribbons. Under the leadership of Mrs. Zerebecka, whose hands were as expressive as a ballerina's, the choir sang a martial refrain; a lilting dance melody, "Mazur;" and a love song—"As soon as I saw you in the green lane I fell in love with you, my dear; you are the very spirit of beauty . . . " The concluding number, set in a minor key and with orchestral accompaniment, had as its poignant theme: "Red poppies blow on the slopes of Monte Cassino; they are drenched not with dew, but with Polish blood. The centuries will slip by, but signs of what is past will remain and the red of the poppies will be deeper because the soil on which they grow has been sodden with Polish blood."

The next item was the Kujawiak, danced by the kindergarten pupils in brief, beribboned skirts and velvet bodices glittering with spangles, and afterwards two wee tots performed a mountain dance. They wore long white trousers embroidered with royal blue and scarlet, short capes also embroidered, and flat, saucerlike hats, and they carried miniature ice-axes, which they flourished vigorously during the dance. Later, a quartette of older girls, similarly attired, presented a dance interpretative of the "freedom of the open country." Each performer sported a chain of gold medallions looped from one side of her waistband, and these jingled musically with the movements of the dance. The leader, with her lissome figure and blonde, shoulder-length hair, resembled a fairy tale prince. The kindergarten children were trained by Mrs. Tietze and the other dancers by Miss Merwid. During the intervals between dances I talked with some of the younger members of the choir. The language difficulty did not prevent us from sharing our mutual appreciation of their companions' artistry.

The choir again delighted the audience with further songs: "Rain, traverse the forests and mountains and then return to the stars—we have no need of you!"; "Crinoline;" "The Periwinkle Wreath"—"little wreath of seven herbs, I had hidden you in a fine new casket, ready for my wedding day;" and the march "Carpathian Brigade." Nine senior girls, in long, flowing white skirts and demure

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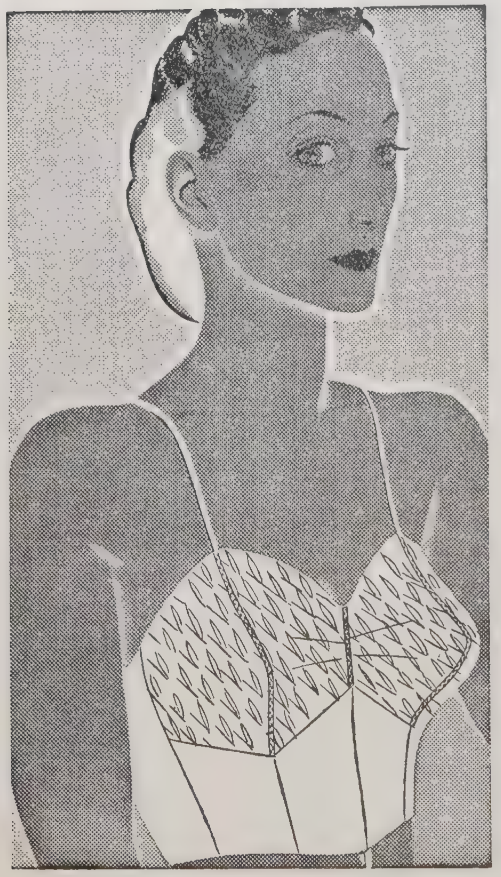

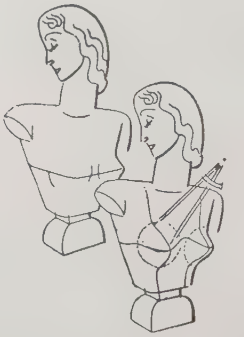

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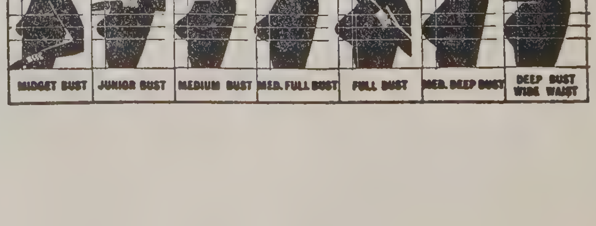

"butterfly" caps, took part in the Silesian trio dance with its gentle rhythm and classical grouping. Two other folk dances were given, both in traditional costume, and the closing tableau of the Krakowiak when the dancers sing, "When you come back I shall give you a white rose . . . the roses bloom and fade again, but you are still away," was most effective.

The concert concluded with a very beautiful Nativity play. White-winged angels sing praises to the Christ-child, while Mary the Mother sits by His cradle. First come the people of the mountains to offer homage, then the townsfolk, and the Three Kings with their gifts of gold, frankincense and myrrh. The Polish saints are followed by a group of refugees with black shawls over their heads. Soldiers enter next, bearing the great red and white flag adorned with the Polish eagle. Last of the worshippers to arrive were women in mourning, an injured child, and a knight in silver armour who typifies the indomitable spirit of Warsaw. All join in beseeching Mary to help "our unhappy people." Mary, too, kneels before the Holy Child and intercedes for the Polish nation. The dialogue and also the words of all the songs throughout the programme were in Polish, but at the close of the performance the children sang our National Anthem in English. The members of the audience felt they had indeed been privileged, as the Acting Prime Minister (the Hon. W. Nash) so aptly phrased it, "to learn something of the culture of a nation that had suffered so much and yet had preserved its ideals and traditions."

◆

Reticent Home Correspondents

I AM not an assiduous letter-writer, and so letters do not come to me frequently. Of those which do arrive, however, I am most eager for one that reaches me at irregular intervals from half a world away. Five years ago the headlines flared, "R.A.F. destroys 185 planes. London's ordeal continues."

"We are digging up the lawn and planning next year's vegetable garden," remarked the letter from London; and next year it said: "We have a wonderful tomato crop." Ever since, blandly ignoring headlines and with both eyes on the censor, it has discussed tomatoes, past, present, and to come.

"I know more than you think," I once replied frenziedly. "I know about the docks, and Oxford Street, and the Strand. Do not speak to me of tomatoes — tell me what is really happening to you."

"Out of a storm of shot and shell" the letter from London made its way, bringing across thousands of miles the atmosphere of home, also the sympathetic query: "Can you not grow tomatoes in Auckland?"

By now I know the layout of their garden better than my own, but nothing of the gardeners themselves, except—"We are all well and cheerful. Don't worry." Indeed, while flowers bloom so constantly in their brief paragraphs, I am sure they are well, despite flying bombs.

But surely there are many womenfolk in New Zealand who will sympathise with my feelings about the tomatoes, and who can understand, too, how welcome will be the letter which, with the removal of the censorship, freely recounts all the experiences concerning which I long to hear.

—**"Cordelia," Henderson.**

Competitions

JULY:

Have you sent in your "Holiday Memories" yet? The competition closes on July 15.

AUGUST:

Which month out of each twelve do you look forward to most? Whether it is rose month, or the Christmas season; autumn with its harvest or the beginning of spring when daffodils dance in the sunlight and pink buds open on the apple trees, there is sure to be one time of the year which appeals to you more than any other, either because of Nature's loveliness or because it marks the anniversary of some special event in your life.

"THE MONTH I LIKE BEST"
First prize, 10/-; second prize, 5/-.
Closing date, August 15.

"MARY,"
"Journal of Agriculture,"
P.O. Box 3004, Wellington.

GANNETS

Where ocean and bright-rimmed horizon meet,
Dun-shadowed cliffs rise high:
Here nest the wanderers with folded wings
Like clouds in the noonday sky.

A vast tide of pinions, white as the spume,
Cresting the green sea-gloom;
Moon-pale as lilies in bridal array—
A meadow of iv'ry bloom—

Gently they rest now the long flight is o'er,
And seen in the westering sun,
Spindrift and clouds and the sleepy birds
Mingle and meet as one.

—*Enid B. V. Saunders.*

◆

Autumnal days are the most beautiful days in the year. Things do not grow any more, they ripen; they fulfil the destiny of the summer, and the thought of Autumn is that it is going down, going forth. When all things in Nature know and feel that Death is coming near, do they sheet themselves in black? They cry: "Bring forth our royal garments!" and the oak puts on the habiliments of beauty, and all the herbs of the field turn to scarlet and yellow and every colour that is most precious, and the whole month of Autumn goes tramping towards Death, glowing and glorious.

—*Henry Ward Beecher.*

BATTLE-SCARRED BRITAIN!

BRITISH PEOPLE NEED FATS, MEATS, SUGAR.

For the past five years Britain and her people have known the full ravages of total war and although they are emerging triumphant from this experience, they still need the foods, we, in New Zealand have in plenty today. Their present fare could not be more monotonous. They urgently need Fats, Meats, Sugar, and protective foods for health. We can supply these.

Recipients in Britain may not ask their friends in New Zealand to send GIFT PARCELS of food stuffs, **it must come as a spontaneous gesture from you.** To meet this ever increasing demand we have established a "GIFT PARCEL SERVICE," in other words we have a series of some twenty parcels containing all that is most urgently required in the way of foodstuffs, all varying in contents and price. All you have to do is to send in to us the name and address of the person to whom you wish the parcel to be sent together with the required money order and we will do the rest.

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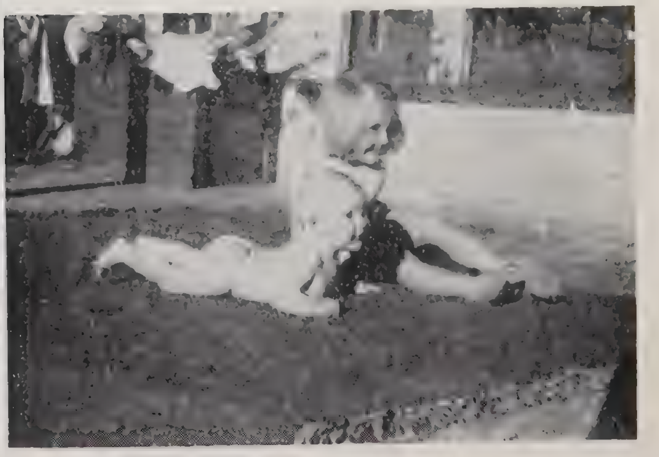
FIRST PRIZE:
"The deerstalker."
—Mrs. A. D. Dick, South Canterbury.



SECOND PRIZE:
Getting their Vitamin D.
—"Pipiwharauroa," Masterton.

Angling for goldfish.

—"Pegasus," Millers Flat.

Mount Madeline.

—Mrs. J. Rollinson, Murchison.

COMPETITION

"Hark, hark, the lark!"

—"Skin," Taranaki.

"Peter's a pet."

—"Biddi-Jan," Cheviot.

" . . . when I'm a man."

—"Fruffy," Te Awamutu.

SOME of the large number of photographs sent in for this month's competition are reproduced on these pages. If "Good Neighbours" get as much fun and pleasure from them as I did, it will have been a very popular competition. This is a good way for "Good Neighbours" to learn more about each other and their varied interests and activities. A further page of entries will be published next month, and I will be pleased at any time to receive photographs of general interest which are suitable for reproduction. Negatives should accompany prints, if possible, with stamped addressed envelope for return. For each photo retained 2/6 will be paid, such photos to become the property of the "Journal."

Mary.

"Tadpoles!"

—"M.E.H.," Millers Flat.

"Tired Tims."

—"Vuv Luv," Nelson.

Mary's at - Home -

TO a wise man happiness is not a fleeting emotion, dependent on mood and circumstance, but a permanent inner glow that diffuses his whole life and the lives of those around him. It brings serenity and repose, two attributes so sadly lacking in this world of chaos.—**"Bebe M."**

ONE of my favourite books is "My Lady of the Chimney Corner," by Alexandra Irving, and from "Anna," the central character who lived at "the bottom of the world," I have gleaned wise counsel on many occasions. It is a book to keep by one's bedside.—**"Teragram."**

MAY I, too, join your happy circle? I am quite new to country life, but I have no desire to return to the city. This little verse by Longfellow is one of my favourites:

"Let us then be up and doing,
With a heart for any fate;
Still achieving, still pursuing,
Learn to labour and to wait."
—**"Ann."**

IT is a perfect morning. There has been a touch of frost and I must go and see how the dahlias have fared. The chrysanthemums are blooming—how we appreciate their brave show at this time of the year! Don't you love the tang of their leaves? I often strip a few and put them on the fire when we gather round after tea.
—**"Cloudy."**

EVENING AT AKAROA

Home glide the snow-white swans,
Recalling old romance,
And memories of songs
Sung once in sunny France.

Home sail the fishing boats,
From lighthouse-cliff and spray;
The gulls skim lazily
Where silvery herrings play.

Blue waves, though sun-kissed still,
Steal to the land's warm arms,
And softly musical
Reflect autumnal charms.

Slowly Dusk's curtain dims
Sweet lilied vale and hill,
While Day goes singing down
Bright paths of daffodil.
—*Violet Curry.*

I HAVE always wanted my son to be a doctor, but his most treasured possessions are a hammer, wrench, spanner, and screwdriver, plus old pieces of machinery with nuts and bolts attached. So, in the years to come, his career will be shaped by his natural inclinations, not by his mother's plans.—**"Mother of Three."**

EVERY month I read with interest the paragraphs by different readers concerning their homes and families and outside interests. I consider it a splendid way of bringing companionship to lonely wives who live in isolated farming districts.
—**"Heath."**

THIS poem was written by Corporal Edgar Wallace in the Boer War:—

"You know of the hate, folly born;
You know of the wrath, money bred;
The impotent rage and the scorn,
The trust and the faith that are dead.
Lest sorrow should spring from the land,
The crop of the seed of the sword,
O, stay the imperious hand;
Give us peace in our time, O Lord."
—**"Cloudy."**

DAY by day the willow and poplar leaves fall and soon there will be only a carpet of leaves to show that Autumn has come and gone. So far we have had no mushrooms, though this time last year we were having them three times a day. Son would get up and, armed with a plate and knife, go out mushrooming, getting back by 6.30 a.m., so that we could have mushrooms for breakfast.

The paddocks are ploughed, worked, and sown down in grass and green-feed. Crutchers will soon be here, and once more we will see—and hear—sheep all day. We have a new pup to rear. He is just like a little bear, red-brown in colour and with a white tip to his tail. I also reared three wild ducklings like little balls of fluff. My brother found them at Christmas and brought them home. Yesterday when I went out one of them was dead, but the other two are still doing well.—**"Biddi-Jan."**

I ALWAYS look forward to a pleasant evening after the arrival of the "Journal," browsing through its pages, and finding lots to satisfy me. We always keep our copies, as there is so much of real value to refer to in them, and only today I looked back per medium of the handy, twice-yearly index, for information on infectious diseases, chicken pox in particular—an unwelcome visitor to our district just now. All I needed to know was contained in a 1940 issue.
—**"Roundabout."**

HOSPITAL SHIP

Out of the mists of dawn the grey ships come—
Escaped to peace from battle-sundered skies
And waters dark with death—steal into harbour . . .
And burning tears fill strained and weary eyes.

For here is beauty! Still, blue water smiles
And silent hills spread sheltering arms around.
The sun shines softly. There are birds that sing . . .
And stillness—and a peace that knows no bound.

God grant this tender loveliness may rest
Like quiet hands on minds distraught with pain,
To heal and bless, and bring to quietness,
And lead from darkness into light again.

And grant that we, when toils of life are past,
May come, like these grey ships, to greater calm,
And find safe anchorage and peace at last
Within the haven of Thy sheltering arm.
—*Jean H. Mather.*

"WHEN thou turn'st away from ill
Christ is this side of thy hill.
When thou turnest toward good
Christ is walking in thy wood.
When thy heart says, "Father, pardon,"
Then the Lord is in thy garden.
When stern duty wakes to watch
Then His hand is on the latch.
But when Hope thy song doth rouse
Then the Lord is in thy house."
(George MacDonald.)
—Sent in by **"Caradon."**

HAPPINESS is not gained by possessions, neither does it come from social position. What we take from life we must also put into life. As I try to guide my children rightly, I hope that their belief and trust will be like

"A strong rock on which they may lean,
A refuge in which they may hide,
A fountain from which they may drink,
A star to guide them in the paths of peace and contentment."
—**"Holly."**

IT is so easy to let other things fill up the day till one barely takes time to see the beauty of the commonplace—firelight; dew-bespangled cobwebs; sun shining on soap bubbles and turning them to glorious hues. I am sending you a poem I love—it is from the book "The Prophet," by Kahlil Gibram. Here is the last stanza:—

"You are the bows from which your children as living arrows are sent forth.
The Archer sees the mark upon the path of the infinite, and He bends you with His might that his arrows may go swiftly and far.
Let your bending in the Archer's hand be for gladness:
For even as He loves the arrow that flies
So He loves also the bow that is stable."

—"Fruffy."

I HAVE a pot-stand which is made from a piece of planed wood and I have always had difficulty in picking it up off the bench. I solved the problem by taking four clothes-pegs and sawing off the knobs with about three-quarters of an inch attached and tacking them on to the stand. I then enamelled the stand red and the legs cream to match my kitchen. The paint can be scrubbed easily and I can lift the stand quickly and without any trouble.—**"Jalcre."**

CHILDREN should begin gardening in the toddler stage. Give your youngster a bucket and spade and a piece of ground for his very own. This is important, because if you want to foster the love of gardening you must let it be the child's own creation—that is half the fun. Very soon, given encouragement, the love of "scrubbing in the good earth, planting growing things, and scattering seeds" (in happy abandon at first) becomes an absorbing interest. But do let it be their own effort. They experience such delight when they find a flower of their own blooming or perhaps a radish or a lettuce grown. The fascination of gardening is never ending because there is no limit to what you can do in a garden. Sun and fresh air are its partners and it is the kind of occupation that soothes tired minds and fretted spirits. Turn your boys and girls into garden lovers and you are giving them a source of enduring happiness which grows with the years.—**"Tiggetty Boo."**

MAGIC . . .

There was magic in the fields today,
I know, for Autumn danced that way;
And as she passed she called to me
To join with her in revelry;
Truly magic there, I know,
I looked for it and found it so. . . .
Brown shadows, set in peaceful pools,
Wee puff-balls white, pink mushroom stools;
Glory in the scarlet leaf,
Gold within the harvest sheaf;
Scattered gems of colours rare
Fallen almost everywhere.
Slender poplars, gold-tipped, tall;
Treasure found where bronze leaves fall;
Crimson of the tangled rose;
Tawny-gold each flower that grows;
Truly magic . . . these—I know,
But then . . . Autumn made it so.

—Mary Kitching.

THANK you, "F.J.B.," for sharing with us your trip through South Canterbury. It is nice to view it through your eyes—one is so apt to take our lovely countryside for granted. Just now the trees look beautiful with their rich-tinted leaves, but the winds will soon leave them bare and then winter will be truly here, and one can enjoy to the full a log fire and a favourite book:

"When April scatters coins of primrose gold
Among the copper leaves in thickets old,
And singing skylarks from the meadows rise
To twinkle in the skies;
When I go forth on such a day
One breath outdoors takes all my care away.
It goes like heavy smoke when flames take hold
Of wood that's green and fill a grate with gold."

—"Peggy."

TO me nothing is more inviting on a cold, wet night than to see the sitting-room lit by the dancing flames of a cheerful log fire and cosy chairs beckoning. Taking possession of my own particular chair, what an exquisite feeling of restfulness steals over me as I sit with closed eyes and folded hands. The day's work is forgotten and nothing disturbs the tranquil atmosphere but the gentle ticking of the clock. As the comforting warmth permeates through me my heart is filled with the wish that every one might be as happily placed. Thus I spend a few moments in quiet thought. When the children were small it was my husband's desire that I should leave all work alone after tea was over and just rest. The habit has grown with the years; I find it an excellent prelude to peaceful sleep, which, in turn, prepares body and mind for the happenings of the morrow. If my day is as full as I can make it, then there is no guilty conscience to reproach me. Maybe it's a lazy way of spending the hours, but oh, how delightfully restful!

"If you are tired or sore oppressed,
Just fold your work away and rest."

—"Rayna."

The Romney Flock

The heavy ewes in mild contentment stand
While he with prideful, practised hand
Runs a snowy furrow through the silken floss
Showing the wondrous length, the crimp, the gloss.
Here the mantle which a queen would grace
In web of woven tweed or knitted lace.
The lambs whose pelts of felty wool are curled
Look with infant wonder on the world.
Watch the pride of pedigree, the crested head
Proving the master's choice, of good blood bred;
And now—within the woolshed voices cease:
Here, the contemplation of a perfect fleece.

—Elsie M. Ryan.

BEFORE I started school we lived in a big rambling house with a large orchard surrounding it. We four children were certainly happy. There was every fruit one could wish for in that orchard; apples and quinces; gooseberries and cherries; stately old pears and tall, spreading walnut trees (we used to get a penny a hundred for picking up walnuts); a row of apricot trees, and chestnuts and hazels, and even pomegranates. What a paradise it was with the broad river's tree-fringed banks forming the front boundary. Here we played with our dolls, and life flowed serenely.—**Pioneer, Taupiri.**

OUR pet lamb has taken possession of the house as well as the garden, and this morning, on coming inside after helping Hubby move an obstinate calf, I found him lying under the kitchen table. He walks in and out of the bedroom at his leisure, and no matter how often he is shut out in the paddock, he always finds his way back.
—Young Mother, Nelson.

SMALL brother and smaller sister were crossing the room hand-in-hand to meet Mummie's friends. The latter were very amused to hear the following conversation.

Smaller sister (in an aggrieved tone): "Don't pull me, John! My leg's sore and you're making it badder."

Small brother (with virtuous air of smug masculine superiority): "You mustn't say 'badder,' Heather—you should say 'more worser.'"

I WISH I could send you some of my primroses—they have been blooming for months. I moved them from a shady bank and made a border of them. I posted several boxes to town and every room in the house has had bowls of primroses, yet you could hardly tell where they had been picked. They are going off a bit now, but

ISSUED BY THE DEPT. OF HEALTH

SCARLET FEVER

Important Advice, Part I.

Scarlet Fever spreads fast. If it's in your district *watch out for sore throats.*

Sore throat, fever, nausea or vomiting are typical symptoms. Where Scarlet Fever is about, the germ may be picked up at school, at work or on a social visit.

Many adults in a scarlet fever zone may suffer from sore throats and a feeling of malaise. Children, on contact with these carriers, will develop the fever and rash.

Those with sore throats should take treatment and stay at home, and all others should keep well clear of them until they are better.

Quarantine restrictions must be obeyed when scarlet fever is around. If it strikes anyone in your household, this is what you do:

● Strictly isolate the patient for three weeks (if not removed to hospital), and longer if there are any discharges or persistent sore throat — until they clear up.

● Keep child contacts away from school and other children for seven days if the patient has gone to hospital; or until he is out of isolation if he is at home.

● Adult contacts who are healthy and without the tell-tale sore throat sign, may continue at their work, unless they are handling food or are brought into contact with groups of children.

When the isolation period is over, or the patient removed to the hospital, fumigants are not necessary to disinfect the room. Boil everything that can be boiled, wash the blankets and put them in the sun, wash out and vacuum-clean the room, and throw it open to fresh air.

Don't take chances with Scarlet Fever.

21A

FOR A HEALTHIER NATION

the petunias I planted last year are beginning to flower again, and I have masses of deep purple violas out. I planted several packets of seed last week, and when I looked out of the window there was young son rolling them in by walking backwards and forwards over the plot! He is nearly two now and running everywhere. He is very fond of the lamb and his pet brown rabbit, and in spite of a few spills he loves to get on the back of the old horse.—**"Biddi-Jan."**

WHEN things go wrong and there seems to be no sun to break through the clouds I then pursue my best gloom-chaser—my dream garden. For a dream garden all one needs is a few florist's catalogues and a vivid imagination. I get out the catalogues and in a few moments I lose myself in the enthralling task of planning the perfect garden. Spacious lawns and tall trees form the background. A lilac walk leads to a secluded gateway. Azaleas outline the terrace and flowering cherries and peach trees gladden the eye in springtime. Daffodils, violets, and primroses carpet the ground at their feet. There are shady corners for lilies-of-the-valley, warm spots where begonias will later bloom, a fernery, and a crazy pathway going down to a rose garden. Always there is the happy song of birds among the green leafiness. Who could possibly remain gloomy in such surroundings?

—**"Taramea," Canterbury.**

From Stillness

When tides return to wantonly beset
Those flower thoughts and sweep them into dust;
Close tight your eyes and inwardly forget
How poppy-red can shiver into rust
Before a sunless day.

Lay hands on calmly restful dreams and let
The golden fields untrampled raise their spears,
While grassy banks of velvet, dewy wet
Absorb the tiredness and empty fears.
That trod your soul to clay.

Know Silence where has lain the breathlessness
Of gentle streams with liquid lulling voice
And let the spirit of all restfulness
Enfold your heart and quietly rejoice
To scatter cares away.

Then when you waken from your dreaming night
To know the glory of a morning sky—
Your eyes will gaze from eagle-soaring height
On tide that bears their travail as they die
—Those griefs of yesterday.

—M. N. Kelly.

The Bird of Sorrows

THERE was once a Bird of Sorrows, tormented for the pleasure of men. He began his life as a little Bird of Greediness, all open beak and clamour, packed snug in a nest of moss and twig; hearing from his nest the rustling of tree-tops, the patter of rain, and the wind in the long summer grasses. Then came a time when his wings were feathered and he could spread them and could fly, when he perched on the branches and sang among the leaves, having joy of the high, free air. For a little while only; for a brief, happy while; till the bird-catcher snared him for pleasure in his song, and shut him for a life-time in prison.

Before the bird had been many days in his prison he had learned the uselessness of beating little wings against bars; but always his heart, his heart beat against them, and he cried aloud in longing for the world he had lost—for the high, free air, and the rustle of the tree-tops, and the patter of rain upon leaves. Then, when they heard him crying, his gaolers would be glad. They would call to each other and smile and say: "Dear little dickie! Isn't it pretty how he sings?" And when he cried to them more piteously, even more piteously, "Give me back my wings, my wings!"—at that they would smile at him all the more, and say, "Listen to dickie, the sweet little bird! We wouldn't part with him for anything!"

So the months went by, and the seasons and the years: spring, summer, autumn, and the sleep of winter—then spring, summer, autumn, again; while he cried in his prison for the world beyond its bars, and, from the window where he hung, watched the birds that were not captive; the sparrows as they chattered in road and on roof tree, the blackbirds thrusting yellow bills into the lawn, and the nightly homeward passing of the rooks. And he cried and cried again: "Why am I not as they?" . . . While his gaolers smiled at dear little dickie.

Then when months had gone by, and seasons had gone by, there came to him at last his day of mercy; which at first he did not know for mercy, since it came to him with suffering and with fear. Even his lovely complaining was stilled; his feathers were a-stare, his eyes dim and closing, and his gaolers tempted him with sugar and green dainties in vain. . . . Till in the night, cold and quiet, came Death, who is the last lord of all; and the little feathered body of the Bird of Sorrows fell down from his perch and lay stiffening.

Then Death, cold and quiet, took the soul of the Bird and carried it up past sun, moon, and stars to high Heaven, and when he said, "I bring with me a Bird of Sorrows," the gate of high Heaven was made open. And the little child angels, when they saw what Death was bringing, stretched out their hands for the Bird that they might love him; but Death shook his head and answered them, "Not yet," and went on to the highest Heaven of all. And, from the dreadful glory that beats about the Throne, there were hands outstretched to take the Bird.

And behold, there looked down at him a face that was all gentleness, and there fell on him tears that were like unto rain, the lovely rain of springtime; and there spoke to him a voice like the rustling of tree-tops and the wind in the long summer grasses:

"Oh, Bird of Sorrows, I also was acquainted with grief!"

Then all the fear went from the heart of the Bird—he forgot the dreadful glory of the Lord Almighty, for the tears of him acquaint with grief. And on the dear hand of God he fluttered out his wings; and from the dear hand of God he flew wide into freedom, high into freedom,—to sing, Bird of Gladness, in the tree-tops, the tree-tops of Paradise.

Young bellbirds.

—Edgar F. Stead photo.

BIRDS ARE SINGING

Birds are singing round my window,
  Tunes the sweetest ever heard,
And I hang my cage there daily,
  But I never catch a bird.

So with thoughts my brain is peopled,
  And they sing there all day long,
But they will not fold their pinions
  In the little cage of song!

THE THRUSH

His throne a tree-top green and high,
This happy songster of the sky
Who greets the op'ning of each day
With many a thrilling roundelay.
His fluting throat swells to the song
Of soft cadenzas sweet and long;
His notes, like glist'ning dewdrops float
From out his velvet lin-ed throat;
Twining my old acacia tree
Into a bower of melody,
'Til yellow tassels gently sway
In time to joyous roundelay;
Making for him a golden throne,
This feathered songster, all alone,
Who sings too-witt, too-witt, too-wee,
Bursting his heart with melody
A-top my old acacia tree.

—*Florence Morgan.*

He who shall hurt the little wren
Shall never be beloved by men.

—*William Blake.*

Be like the bird which on frail branches balanced
  A moment sits and sings;
He feels them tremble, but he sings unshaken,
  Knowing that he has wings.

—*Victor Hugo.*

. . . The west was a lake of luminous crocus yellow, clear and translucent as water. In this, like green lilies, floated minute flakes of cloud. Among them, peaceful and motionless, lay water birds of soft grey cloud, sleeping among the lilies with folded wings.

—From "The House in Dormer Forest," by Mary Webb.

Seagulls

They have taken the brightness of the spray
Into their wings, and stolen the long sweep
Of winds for their flight.
They are familiar with the first shy light
Of unsophisticated day
Upon the tide-washed sands.
But in the night
Their cries sing sharply in the startled air,
Breaking the symmetry of sleep,
Tossing the echoes of a strange despair
Across the deep.

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BISCUIT BAKING

BISCUIT baking is the specialty of "Molly," Thames Line. In a recent letter she listed some of the varieties she makes most frequently:—"Malt biscuits for Sonny's school lunch; Anzac biscuits to take down to the milking shed; forcer biscuits, crinkle-edged and joined together with pink icing, for special occasions; thin cream crackers when friend May is coming, as these are her favourites; ginger biscuits for the lads overseas; not forgetting to shape little gingerbread men and animals for the children; shortbread biscuits for the brave folk in England; coconut biscuits like the ones you buy."

I expect many other "Good Neighbours" like to keep their tins filled, too, so here are some tried and tested recipes which you will find useful when you want to replenish your store of home-made biscuits.

MALT BISCUITS.

1½ cups flour, 2oz butter, 2oz lard, 1 egg, ½ teaspoon baking soda, 1 tablespoon malt extract, ¾ cup sugar.

Cream the butter, lard and sugar, and lightly beat in the egg. Add the malt extract and the sifted flour and baking soda and mix well. Turn on to a floured board and roll out thinly. Cut into oblongs (a mustard tin makes a good cutter). Bake in a moderate oven 15 minutes.

ANZAC BISCUITS.

2oz butter, 2oz lard, 1 cup sugar, ¾ cup wheatmeal, ¾ cup bran, 1 tablespoon golden syrup, 1 cup coconut, 1 cup flour, ¾ cup walnuts, 1 teaspoon baking soda, 2 tablespoons water, pinch of salt.

Sift the flour, and add the wheatmeal, bran, pinch of salt, sugar, and walnuts. Melt the golden syrup with the butter, lard, water, and soda, and stir into the dry ingredients. Drop spoonfuls on cold, greased trays, and bake in a moderate oven 15-20 minutes.

FOAM BISCUITS.

½ cup sugar, ½ cup milk, ½ teaspoon baking soda, ½ cup lard and butter, ½ teaspoon salt, 1½ cups flour, ½ cup coconut, vanilla or raspberry flavouring.

Rub the lard and butter into the sifted flour and add the salt, coconut and flavouring. Heat the sugar and milk together in a saucepan and then add the soda and, while it is foaming, stir the mixture into the dry ingredients. Roll out on a floured board and cut into rounds with a fluted cutter. Bake in a moderate oven 12-15 minutes. When cool join together in pairs with pink icing flavoured with vanilla or raspberry.

CREAM CRACKERS.

¼lb flour, 2oz butter, 1 teaspoon sugar, pinch of salt, milk, 1 teaspoon baking powder.

Sift the flour and rub in the butter, then add the baking powder, sugar, and salt. Mix to a stiff dough with the milk. Turn on to a floured board, roll thinly, and cut into squares. Prick well and bake in a hot oven for 10 minutes.

GINGERNUTS.

1 cup sugar, 1 cup golden syrup, 3 cups flour, 1 cup butter and dripping or butter and lard, 1 teaspoonful baking soda, 1 dessertspoon ground ginger.

Heat the fat, syrup and sugar together, then sift in the flour, soda and ginger. Mix well together and roll into small ball. Press them down a little, and bake in a moderate oven for 15 minutes. The ginger mixture can also be rolled out and cut into fancy shapes if so desired.

SHORTBREAD BISCUITS.

¼lb flour, 2oz cornflour, 2 tablespoons icing sugar, 2oz butter, 2oz lard.

Cream butter, lard and sugar, then sift in the flour and cornflour. Knead the mixture well. Roll out to about ¼in thickness, cut into small squares, and prick with a fork. Place on a tray which has been covered with white paper. Bake in a slow oven about 25 minutes.

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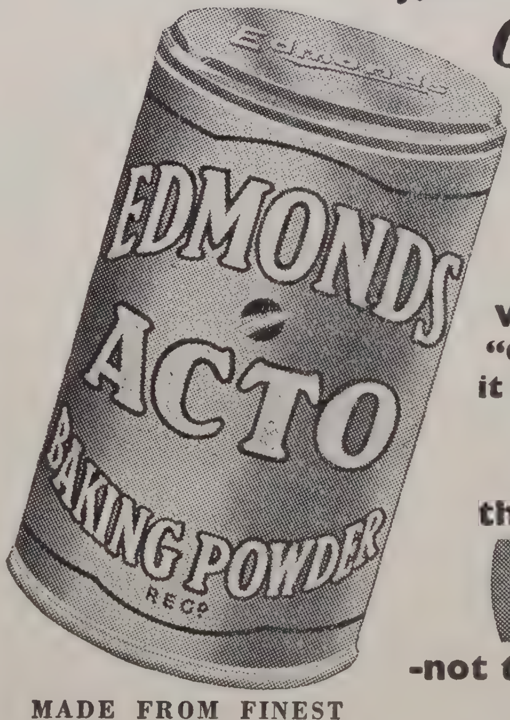
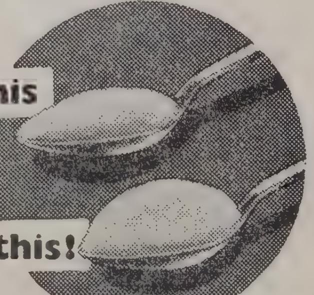


When a recipe says "One Teaspoonful" it means—



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COCONUT BISCUITS.

2oz butter, 1oz lard, 1 cup flour, 1 egg, 1 teaspoon baking powder, ¾ cup coconut, almond flavouring, ¾ cup sugar.

Cream the butter, lard, and sugar, then add the beaten egg. Sift in the flour, add the coconut and baking powder and almond essence. Mix all together, and drop in spoonfuls on a cold greased tray. Bake in a moderate oven about 15 minutes.

COFFEE RUSKS.

4oz sugar, rind of 1 lemon, ½lb flour, 2 teaspoons coffee essence, ½ teaspoon baking powder, ½ teaspoon baking soda, 2oz butter, 2oz dripping.

Cream the butter, dripping, and sugar, add the grated lemon rind, then sift in the flour, baking powder and soda. Lastly add the coffee essence. (Use a little more coffee essence if necessary.) Mix into a stiff dough, roll out to ½in thickness, and cut into fingers. Bake in a moderate oven till nicely browned.

CINNAMON FINGERS.

2 tablespoons sugar, 1 tablespoon golden syrup, 2oz butter, 1oz lard, 1 teaspoon baking powder, ½lb. flour, 1 egg, 2 teaspoons cinnamon.

Cream the butter, lard and sugar, add the melted golden syrup and beaten egg. Stir in the dry ingredients, and roll out and cut into fingers. Bake in a slow oven for 20 minutes. Join together in pairs with raspberry jam.

OATMEAL MACAROONS.

1¼ cups oatmeal, 1 cup flour, 2oz butter, 2oz lard, 1 teaspoon baking powder, 1 egg, ½ cup cocoanut, ¾ cup raw sugar.

Rub the butter and lard into the sifted flour, add the oatmeal, coconut, and baking powder, and mix all together with the beaten egg. Add a little milk if the mixture is too stiff. Roll into small balls and press down a little. Bake in a moderate oven till golden brown.

ARROWROOT BISCUITS.

6oz flour, 3oz arrowroot, 2oz butter, 2oz lard, 4oz icing sugar, ¼ teaspoon baking powder, white of egg, vanilla essence.

Sift the flour and arrowroot together and rub in the butter and lard. Add a few drops of essence of vanilla, the icing sugar and baking powder, and then mix to a stiff paste with the white of 1 egg. Roll out and cut into large rounds and bake in a moderate oven until crisp.

CHOCOLATE WHEELS.

½ cup sugar, 2oz butter, 2oz lard, 1 egg-yolk, milk, vanilla flavouring, pinch salt, 4 tablespoons cocoa, ½ teaspoon baking powder.

Cream all the fat except 1½ teaspoons, and then beat with the sugar till light and fluffy. Add the beaten egg-yolk, 1 or 2 tablespoons milk, the flour, salt, and baking powder, and mix to a dough. Divide this into halves. Mix the cocoa and vanilla with the remaining 1½ teaspoons melted fat, and stir this into one half of the dough. Roll out both lots of dough thinly, and place the chocolate sheet on top of the white one. Roll the two up together like a Swiss roll. Leave in a cool place for 30 minutes. Then cut into slices about 1in in thickness and bake for 10-12 minutes at biscuit heat.

CHOCOLATE BISCUITS.

2oz butter, 2oz dripping, 4oz sugar, ¼ cup milk, pinch of salt, 8oz flour, 4oz cornflour, 1 dessertspoon golden syrup, 1 tablespoon cocoa, 1 teaspoon baking soda, vanilla essence.

Cream the butter, dripping, and sugar, add the melted golden syrup and the baking soda dissolved in the milk. Mix in the dry ingredients. Roll out and cut into rounds. Bake about 15 minutes in a moderate oven. When cool join together in pairs with chocolate icing, or top each biscuit with chocolate icing and chopped walnuts.

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SUBSCRIPTION RATES.

The *Journal* is issued monthly. The subscription within New Zealand, which is payable in advance and includes postage, is 2s. 6d. a year. The overseas subscription is 5s. Subscriptions should be forwarded or paid direct to any office of the Department of Agriculture in the Dominion. Single copies, price 6d., are available from the Department of Agriculture, Box 3004, Wellington.

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The Minister of Agriculture does not accept responsibility for any of the private and trade advertisements included in this publication.

Printed by Blundell Bros., Ltd. (The Evening Post), Wellington—16668.

The New Zealand Journal of Agriculture

Volume 70, January—June 1945.

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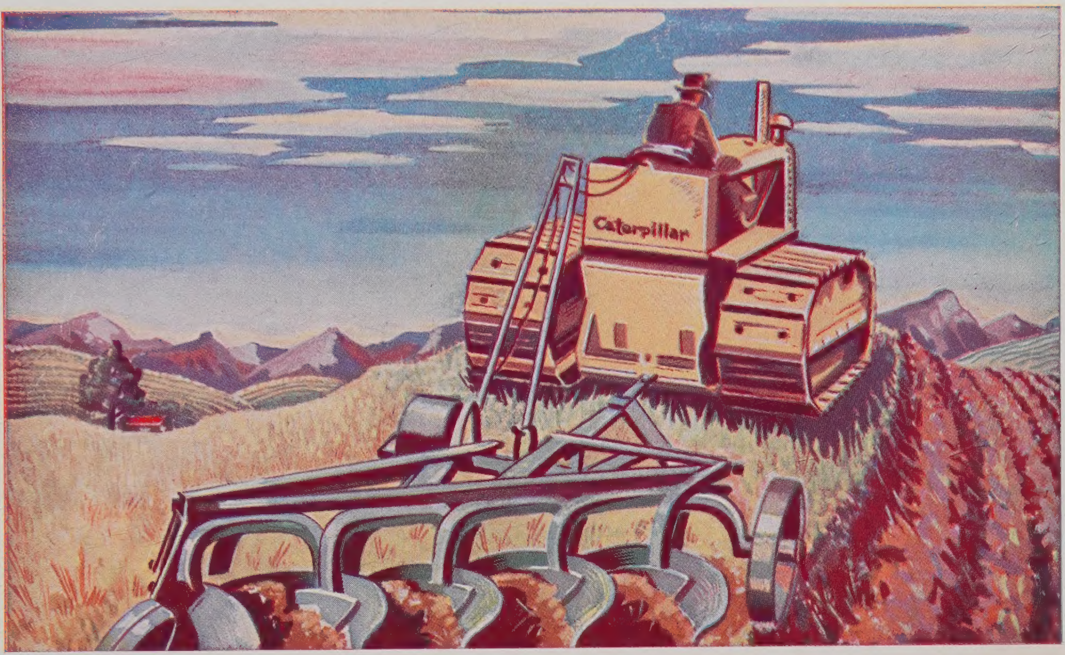

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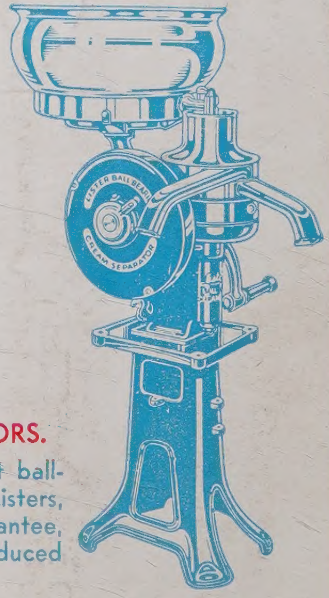

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